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(54) GLUING DEVICE FOR A BOX FORMING MACHINE AND RELATED GLUING METHOD

KLEBEVORRICHTUNG FÜR EINE KASTENFORMMASCHINE UND ZUGEHÖRIGES
KLEBEVERFAHREN

DISPOSITIF DE COLLAGE POUR MACHINE DE FORMATION DE BOÎTES ET PROCÉDÉ DE
COLLAGE ASSOCIÉ

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(56) References cited:
WO-A1-2005/075185 GB-A- 2 090 548
US-A- 3 218 940 US-A- 6 029 884
US-A1- 2007 199 648

EP 2 807 020 B1

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Description

Technical field

[0001] This invention relates to a gluing device for a box forming machine and to a related gluing method.

Background art

[0002] The invention relates to the technical field of industrial processing of sheets of paper or cardboard for forming finely finished, quality boxes. These boxes are made from specially shaped sheets, called blanks, consisting of a base and a plurality of segments (or panels) connected to the base and foldable relative to it to make up a sidewall of the box.

[0003] As regards the shape of the blank, generally speaking the number of segments of the blank is equal to the number of sides of the base and each segment is connected to a respective side of the base. This type of blank may be generally referred to as "petalled", like a flower.

[0004] Blanks of other shapes are also used, however.

[0005] For example, the number of segments may be equal to (or greater than) the number of sides of the base, but the number of segments connected directly to the base may be less than the number of sides of the base since some of the segments may be connected to other segments.

[0006] In such a case, the blank is referred to as "H-shaped" or "T-shaped" or "cross-shaped", depending on the configuration adopted by the blank when it is laid out flat.

[0007] If the segments are greater in number than the sides of the base, some of the segments are associated with other segments and are foldable sideways to cover the same face of the sidewall of the box, each enclosing a respective vertical edge of that face.

[0008] It should be noted that the invention disclosed herein is applicable independently of the type of blank used.

[0009] The industrial process starting with the blank and ending with the finished box comprises two distinct steps: a step of forming the box, followed by a step of covering the box by applying a covering sheet to it.

[0010] This invention relates specifically to the step of forming the box.

[0011] The forming step in turn comprises two successive steps: a first step of folding, followed by a step of sealing or closing.

[0012] In the step of folding, the segments of the blank (which is laid out flat to start with) are folded about the perimeter of the base to form the sidewall of the box. The sidewall of the box defines as many lateral edges as there are corners of the base.

[0013] Of these vertical edges (of the vertical wall of the box), at least two are defined by a pair of adjacent lateral borders belonging to consecutive folded seg-

ments. This applies generally speaking to any type of blank. More specifically, if the blank is of the "petalled" type, all the lateral edges are defined by corresponding pairs of adjacent lateral borders belonging to consecutive folded segments (on the other hand, if the blank is T-shaped or H-shaped, only a subset of the lateral edges is defined by corresponding pairs of adjacent lateral borders of consecutive folded segments).

[0014] It should be noted that this invention is not limited to a specific type of blank but applies to all type of blanks.

[0015] In particular, box forming machines usually comprise a vertically movable die which is operatively coupled to an inner surface of the base (or of the sidewall of the box) to fold the segments of the blank by causing them to interact with fixed contact members.

[0016] When the step of folding the segments about the base is over, the above mentioned lateral edges are open and a step of connecting adjacent panels is necessary to close the lateral edges.

[0017] For this purpose, according to automatic forming machines known in the prior art, a step of sealing follows by which the open lateral edges of the box sidewall are joined (that is, closed).

[0018] As regards the step of sealing, two alternative technical solutions are essentially known.

[0019] According to a first solution (described for example in patent document WO2007/129201A in the name of the same Applicant as this invention), sealing occurs by applying sealing strips (called "stay tapes") to the open lateral edges in order to close them.

[0020] More specifically, box forming machines usually comprise sealing heads having respective sealing tape dispensers and applicator elements ("pressers") designed to apply strips of sealing tape to corresponding open lateral edges of the box. The sealing heads can move towards and away from the box between a non-interference position where they are clear of the box and a sealing position where they operate on the corresponding open lateral edges to press the tapes against respective lateral edges of the box, thereby sealing them.

[0021] In the step of sealing, the function of the die is that of defining a constraining element operatively inserted snugly into the space inside the box during the action of the pressers, thereby preventing the pressers from deforming the sidewall of the box.

[0022] In a second solution (described for example in patent document WO2009/090481A2 in the name of the same Applicant as this invention) hot-melt glue is distributed along the vertical edges of the sidewall of the box, in the interstices formed by the borders of the pairs of segments placed side by side. In practice, this forms a bead of glue which joins the end borders of the joined segments to form the corresponding edges of the sidewall.

[0023] The pressers are then moved forward to abut against the edges, with the further important function of cooling the glue.

[0024] The solution which involves applying the stay tapes is simple and reliable but has the disadvantage of worsening the appearance of the box because the tapes are not negligible in thickness (compared to the blank) and are therefore visible.

[0025] The solution which involves spreading hot-melt glue along the gap formed by the borders of the folded segments to form the edges of the sidewall of the box avoids the use of the stay tapes, thereby improving the aesthetic appearance of the box, but is inconvenient because it is particularly complicated (and hence relatively unreliable). The complication is due, for example, to the need to cool the glue and the difficulty of spreading the glue precisely in the interstices.

[0026] Thus, neither of the techniques described above is free of disadvantages. Moreover, it should be noted that another requirement in the sector of fine quality boxes regards the box edges, which must be sharp and well-defined, without visible signs of misshapen or rounded parts.

[0027] For this purpose, the use of special blanks is known in the prior art (for example, from patent document US6029884). These blanks are obtained by a process which comprises trimming the sheet of paper to form V-shaped grooves.

[0028] Thus, in a blank of this type (modified), the free sides of some lateral segments (the sides that are joined to form the sidewall of the box), as well as the sides for joining the base to the segments, are bevelled to define oblique faces contained in the thickness of the blank.

[0029] In this solution, the glue is spread on all the oblique faces defined by the bevels (and thus along all the sides of the base and along the sides of the segments) when the blank is laid out flat horizontally (and thus, before the segments are folded to form the vertical edges of the box).

[0030] In this solution, there is a supporting structure configured to enable the blank to move in a feed plane along a longitudinal feed direction to convey it to a gluing station.

[0031] The glue is applied by glue heads which are movable along predetermined directions parallel to the feed plane in such a way as to spread the glue on the oblique faces.

[0032] This method has a twofold advantage: on the one hand it allows production of boxes whose sharp edges have none of the aesthetic flaws due to the stay tapes, and on the other, it avoids the complications associated with spreading hot melt glue along interstices of vertical edges. The gluing system of the special V-grooved blank described in patent document US6029884 has some limitations which make it unsuitable for use in an automatic box forming machine.

[0033] In this regard, it should be noted that a blank gluing system, in order for it to be used in an automatic forming machine, must meet not only the need for glue spreading precision but also that for high speed (so as to guarantee a high output per hour).

[0034] US2007/199648A discloses a method for producing blanks from cardboards.

Disclosure of the invention

[0035] This invention has for an aim to provide a blank gluing device for an automatic box forming machine which overcomes the above mentioned disadvantages of the prior art.

[0036] More specifically, it is aim of this invention to provide a blank gluing device for an automatic box forming machine which is particularly precise and suitable for use in an automatic box forming machine.

[0037] Another aim of this invention is to provide a blank gluing device for an automatic box forming machine which is particularly rapid.

[0038] A further aim of this invention is to provide a method for gluing flat blanks which is particularly precise and suitable for use in a box forming process implemented by automatic machinery.

[0039] The above mentioned aims are fully achieved by the apparatus and method according to the invention as characterized in the appended claims.

[0040] More specifically, the gluing device according to the invention is a gluing device for a box forming machine and is configured to apply liquid glue to a flat blank of paper or cardboard having a base and a plurality of segments connected to the base and foldable to form a box sidewall, where the free sides of the segments, designed to be joined to form the edges of the box sidewall, are bevelled to define oblique faces contained in the thickness of the segments.

[0041] The gluing device comprises:

- a supporting structure configured to enable the blank to move in a feed plane along a longitudinal feed direction to convey it to a gluing station;
- at least one liquid glue dispensing nozzle movable along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces.

[0042] According to the invention, the supporting structure comprises:

- a first and a second guide positioned longitudinally in the feed plane and shaped in such a way as to prevent transversal movements of the blank and to slidably support lateral end portions of the segments of the blank;
- positioning means operating on the blank to move it to a predetermined longitudinal position in the gluing station;
- locking means operating on the blank in order to hold the blank in place so it is in the same plane as the feed plane while it is at the predetermined longitudinal position.

[0043] This guide system, combined with the positioning means and with the locking means, allows the blank to be positioned extremely precisely and held in place while the glue dispensing nozzles are working. This ensures the glue is applied correctly and makes the device particularly precise.

[0044] Furthermore, according to the invention, said at least one liquid glue dispensing nozzle is inclined with respect to the feed plane, in such a way as to spread the glue perpendicularly to said one or more of the oblique faces.

[0045] It should be noted that the guides are configured to support the end portions of blank segments and, in particular, the guides are spaced from each other to define an empty space between them.

[0046] This solution makes it possible to leave the base of the blank free to be moved downwards without constraints or interference. That makes the device especially suited to be used in an automatic forming machine, allowing a particularly high processing speed to be reached. In effect, after the glue has been spread, the blank is lowered directly to fold the segments without having to move the blank sideways away from the gluing station.

[0047] Preferably, the predetermined direction of moving the at least one nozzle is perpendicular to the longitudinal blank feed direction defined by the supporting structure.

[0048] This allows the glue to be spread only along the oblique surfaces positioned transversely relative to the longitudinal blank feed direction. This has the advantage of making the device particularly precise, since the longitudinal positioning of the blank, because it is performed by specific positioning means, is particularly precise relative to transversal positioning, since the guides must leave a minimum possibility of transversal movement (play) to allow it to move forward along the guides themselves. Furthermore, spreading the glue only on the transversal oblique faces (and not on the longitudinal ones) saves time.

[0049] In light of this, it should be noted that the device preferably comprises a pair of nozzles which are spaced along the longitudinal direction.

[0050] This allows the speed of the device to be further increased because the entire step of spreading the glue is completed in the interval of time taken by the nozzles to move transversely across the blank.

[0051] Preferably, the pair of nozzles is positioned at a variable distance along the axis parallel to the longitudinal blank feed direction defined by the supporting structure. This makes changeover particularly easy.

[0052] In light of this, it should be noted that the positioning means, too, are provided with adjusters which make changeover of the device particularly quick and easy, as described in more detail below.

[0053] It should be noted that, for their part, the locking means are important for the precision and reliability of the device.

[0054] In effect, the locking means guarantee that while the glue is being spread the blank does not undergo deformation or bending (moving under the force of gravity outside the feed plane) which would prevent the glue from being correctly spread on the oblique faces of the edges (it should be noted that the V-shaped grooves formed on the blank weaken it and make it particularly susceptible to such deformation).

[0055] The invention also provides a forming machine for making boxes of paper or cardboard from flat blanks and comprising the gluing device.

[0056] The forming machine is particularly precise and fast and allows boxes to be made automatically from the special blanks (with V-shaped grooves). Preferably, the forming machine also comprises a system for applying stay tapes to the edges of the sidewall of the box (this system being of a *per se* known type).

[0057] Advantageously, that makes the forming machine particularly flexible since it can make boxes from blanks of any kind.

[0058] In effect, if the blank is a special blank (with V-shaped grooves), the gluing device is enabled and the system for applying stay tapes is disabled. Vice versa, if the blank is of a traditional type (without V-shaped grooves), the gluing device is disabled and the system for applying stay tapes is enabled.

[0059] The invention also provides a gluing method for applying liquid glue to a flat blank of paper or cardboard having a base and a plurality of segments connected to the base and foldable to form a box sidewall, where the free sides of the segments, designed to be joined to form the edges of the box sidewall, are bevelled to define oblique faces contained in the thickness of the segments.

[0060] According to the invention, the method comprises the following steps:

- feeding a blank to a gluing station, by making the blank slide along a longitudinal direction, with lateral end portions of blank segments slidably supported on a first and a second guide positioned longitudinally in the feed plane and spaced from each other to define an empty space between them;
- positioning the blank at a predetermined longitudinal position (in line with a predetermined reference axis perpendicular to the feed plane), in the gluing station by a controlled movement of the blank along the longitudinal direction;
- locking the blank at the predetermined longitudinal position while keeping it in the same plane as the feed plane;
- moving at least one liquid glue dispensing nozzle along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces defined by the bevelled edges.

Brief description of drawings

[0061] These and other features of the invention will become more apparent from the following detailed description of a preferred, non-limiting embodiment of it, with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view illustrating a box forming machine equipped with a gluing device according to this invention;
- Figure 2 illustrates a detail A from Figure 1, namely the gluing device;
- Figure 3 illustrates the device of Figure 2 according to a different perspective;
- Figure 4 illustrates a first detail of the device of Figure 3, namely a blank conveyor;
- Figure 5 illustrates a second detail of the device of Figure 3;
- Figure 6 illustrates a blank in a perspective view;
- Figure 7 illustrates the blank of Figure 6, in a view along the section line A-A shown in Figure 6;
- Figure 8 illustrates the detail of Figure 4, with a blank coupled thereto, in a first operating configuration;
- Figure 9 illustrates the detail of Figure 4, with a blank coupled thereto, in a second operating configuration.

Detailed description of preferred embodiments of the invention

[0062] The numeral 1 in the drawings denotes a box forming machine according to this invention.

[0063] The forming machine 1 is a machine for forming boxes of paper or cardboard from flat blanks 2 (of paper or cardboard), having a base 3 and a plurality of segments 4 connected to the base 3 and foldable to form a box sidewall.

[0064] The forming machine 1 is set up to use special blanks 2 having the features described below (illustrated in Figures 6 and 7).

[0065] The free sides of the segments 4, which are intended to be joined to form the sidewall of the box, are bevelled to define oblique faces 5 contained in the thickness of the segments 4.

[0066] Generally speaking, this special blank (hereinafter referred to simply as "blank", for short) is made from a sheet on whose top face V-shaped grooves are formed (for example by cutting) along straight trajectories comprising (defined by) the sides of the base 3.

[0067] Preferably, therefore, the sides of the base 3 and the sides of the segments 4 connected to corresponding sides of the base 3 are also bevelled to define oblique faces contained in the thickness of the base 3 and of the segments 4, respectively.

[0068] The numeral 6 in Figures 6 and 7 denotes the oblique faces on the sides of the base 3.

[0069] Preferably, these oblique faces 5, 6 are inclined at an angle of approximately 45 degrees to the plane defined by the blank 2. That way, when the segments 4

are folded relative to the base to form a right angle, the lateral oblique faces 5 of the segments 4 and the oblique faces 6 of the base 3 come into contact with each other.

[0070] The forming machine 1 (illustrated schematically in Figure 1) comprises:

- folding elements (not illustrated, of substantially known type) operating on the segments 4 of the blank 2 in such a way as to fold them relative to the base 3;
- presser elements 7 (partly illustrated, of substantially known type) movable towards and away from the box in order to press against the vertical edges of the box sidewall (the edges being formed when the free sides of the folded segments 4 are joined to each other);
- manipulating means, configured to interact with the blank 2 and with the box to impart vertical movements perpendicular to the direction of movement of the presser elements 7.

[0071] The manipulating means comprise a die 8 shaped to snugly occupy the inside of the box and connected to a motor-driven shaft 9 which moves it along a predetermined vertical axis (according to a substantially known method).

[0072] Also, preferably, the forming machine 1 comprises stay tapes (not illustrated, but of a *per se* known type) coupled to the presser elements 7 to allow strips of the stay tapes to be applied to the vertical edges of the box sidewall in order to seal them (according to a method known in the trade, applicable to any type of blank and not only to the above described special blanks, that is, blanks with V-shaped grooves).

[0073] According to the invention, the forming machine 1 comprises a gluing device 10 for applying glue (liquid glue, preferably of the hot-melt type) on the (special) blanks 2.

[0074] Indeed, the invention has for an object the gluing device 10 as well as the forming machine 1 which incorporates the device 10.

[0075] In effect, the device is designed to be connected to a traditional forming machine 1 in order to modify it to make it particularly suitable for forming boxes from the (special) blanks 2.

[0076] The description below will therefore focus on the gluing device 10.

[0077] The gluing device 10 comprises:

- a supporting structure 11 configured to enable the blank 2 to move in a feed plane along a longitudinal feed direction to convey the selfsame blank 2 to a gluing station;
- a supporting and movement system 12 for at least one liquid glue dispensing nozzle 13, configured in such a way that the at least one nozzle 13 is movable along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces 5 of the segments 4.

[0078] The supporting structure 11 is illustrated in detail in Figures 4, 8 and 9. The supporting structure 11 comprises a first and a second guide 14 positioned longitudinally in the feed plane of the blank 2 to define the longitudinal direction of movement of the blanks 2.

[0079] Each guide 14 is shaped in such a way as to prevent transversal movements of the blank 2 (that is, movements perpendicular to the longitudinal direction of movement and contained in the feed plane).

[0080] Also, each guide 14 is shaped to slidably support a portion of the blank 2. More specifically, the guide 14 is shaped in such a way as to slidably support a lateral end portion of one of the segments 4 of the blank 2.

[0081] In the example illustrated, each guide 14 has an L-shaped or C-shaped profile, the guides 14 being opposed to one another.

[0082] More specifically, in the example illustrated, each guide 14 comprises a ledge 15, which lies in the feed plane, for slidably supporting the lateral portions of the blank 2.

[0083] More precisely, it should be noted that the feed plane (that is, the plane in which the blank 2 lies) is defined by the large surfaces of the ledges 15 on which the blank 2 itself rests.

[0084] Further, each guide 14 comprises a wall 16 perpendicular to the ledge 15 (and to the feed plane).

[0085] Thus, the walls 16 of the guides 14 laterally delimit a slideway for the blank 2, preventing transversal movements of the latter.

[0086] The first and second guides 14 are spaced from each other to define an empty space between them.

[0087] The supporting structure 11 also comprises brackets (not illustrated) for connecting the guides 14 to a frame of the machine 1. Alternatively, the guides 14 (and, more generally speaking, the supporting structure 11) may be fastened to any base in a fixed position relative to the frame of the forming machine 1.

[0088] The forming machine 1 (that is, the gluing device 10) also comprises a pushing element (not illustrated, of *per se* known type, consisting for example of a finger connected to an actuator) movable longitudinally between the guides 14 to move the blank forward along the guides 14 towards the gluing station.

[0089] Thus, the supporting structure 11, together with the pushing element, constitutes a conveyor adapted to feed the blanks 2 to the gluing station. Further, according to the invention, the supporting structure 11 comprises positioning means 17 operating on the blank 2 to move it to a predetermined longitudinal position in the gluing station.

[0090] It should be noted that the predetermined longitudinal position is, more specifically, a position of alignment with a predetermined reference axis perpendicular to the feed plane and consisting preferably of the axis (vertical) along which the die 8 moves.

[0091] In the preferred embodiment illustrated, the positioning means 17 comprise at least a first pusher 18 configured to interact with a corresponding border of one

of the segments 4 of the blank resting on the (ledges 15 of the) guides 14, the blank being positioned transversely, in order to impart a controlled movement to the blank 2 along the longitudinal direction.

[0092] Preferably, the positioning means 17 comprise at least one second pusher 19 positioned at a predetermined distance from the first pusher 18 along the longitudinal direction, the first pusher 18 and the second pusher 19 operating on corresponding borders of segments 4 of the blank 2 (resting on the ledges 15 of the guides 14) from longitudinally opposite sides, that is, in such a way that the first pusher 18 and the second pusher 19 are positioned downstream and upstream of the blank 2 positioned in the gluing station, relative to the advancing direction of the blank along the longitudinal direction.

[0093] In practice, the blank 2 positioned in the gluing station is longitudinally interposed between the first pusher 18 and the second pusher 19. Preferably, the positioning means 17 of the supporting structure 11 comprise a pair of first pushers 18 and a pair of second pushers 19.

[0094] In practice, in the preferred embodiment illustrated, the positioning means 17 comprise a total of four pushers operating on both the segments 4 (transversely opposed and resting on the ledges 15 of the guides 14), on the opposite transversal sides of the selfsame segments 4.

[0095] The first pushers 18 are preferably associated with the guides 14.

[0096] The second pushers 19, too, are preferably associated with the guides 14. Thus, the pushers 18 and 19 are configured to interact with corresponding transversely positioned borders of the blank segments 4 resting on (the ledges 15 of the) guide 14.

[0097] The pushers 18 and 19 (consisting, for example, of the pistons of corresponding cylinder/piston assemblies) are movable longitudinally between an extended position where they abut against the borders of the blank 2 when the blank 2 is at the predetermined longitudinal position and a withdrawn position where they are away from the blank 2.

[0098] The pushers 18 and 19 are shown in the extended position in Figure 8 and in the withdrawn position in Figure 9.

[0099] Preferably, the ends of the first pushers 18, that is the pushers 18 positioned downstream, define flat portions 20 positioned perpendicularly to the feed plane (to provide a better grip on the borders of the segments 4).

[0100] Preferably, the second pushers 19, that is, the pushers 19 located upstream (of the blank 2 positioned in the gluing station), have teeth 21 (pivotally connected to the end of a stem, that is, of a piston, of a corresponding second pusher 19) which are movable between a first operating position where they are spaced from the feed plane of the blank 2 so as not to interfere with blank feed, and a second operating position where they intersect the feed plane so as to define an abutment for the transversal border of the blank 2.

[0101] Preferably, the teeth 21 of the second pushers

19 oscillate about respective transversal axes.

[0102] Preferably, the teeth 21 of the second pushers 19 oscillate freely. That way, the blank 2 itself, as it advances along the longitudinal direction towards the gluing station, moves the teeth 21 to the first operating position. Then, once the blank 2 has passed them, the teeth 21 return to the second operating position by gravity (the second operating position being a position of equilibrium into which the teeth 21 tend to move when no external forces are applied to them).

[0103] The second pushers 19 are also equipped with stops 22. The teeth 21 abut against the stops 22 when they are at the second operating position. The stops 22 are configured to prevent the teeth 21 from rotating in response to a pushing action (for example from the blank 2) backwards away from the gluing station along the longitudinal direction.

[0104] Alternatively, instead of the stops 22, any other suitable system may be used to allow the teeth 21 to move from the second operating position to the first only when the blank 2 passes as it advances towards the gluing station, preventing this movement in response to a force tending to move the blank backwards in the opposite direction.

[0105] Preferably, the pushers 18 and 19 are connected to the guides 14. Preferably, the pushers 18 and 19 are slidably coupled to the guides 14 (for example, they are mounted on sliders 23 that run on rails 24 defined by the guides 14).

[0106] The positioning means 17 preferably also comprise locking/unlocking means (for example brakes which can be operated by levers 25).

[0107] This makes it possible to adjust the position of the pushers (of the first pushers 18 and, by means of a similar system, also of the second pushers 19) longitudinally and to decide the exact point they must be fixed to on the guides 14.

[0108] This adjustment system has two functions.

[0109] A first function is that of aligning the positioning means 17 relative to a vertical axis (that is, perpendicular to the feed plane which the guides 14 lie in) of the forming machine 1, for example, relative to the vertical axis of movement of the die 8.

[0110] A second function is that of adjusting the distance (along the longitudinal direction) between the first pushers 18 and the second pushers 19, in order to adapt the positioning means 17 to different box sizes.

[0111] Preferably, the pushers 18 and 19 are pneumatic.

[0112] Preferably, the pushers 18 and 19 have a predetermined stroke (length of movement of the stem, or piston, relative to the cylinder).

[0113] The predetermined stroke (fixed) is determined during a preliminary step of calibrating the gluing device 10 (described in detail below).

[0114] Further, according to the invention, the supporting structure 11 comprises locking means 26 operating on the blank 2 for holding the blank in place so it is in the

same plane as the feed plane while it is in the predetermined longitudinal position (determined by the positioning means 17).

[0115] The locking means 26 are preferably associated with the guides 14.

[0116] Preferably, the locking means 26 define jaws 27 which are movable between an open position of non-interference with the blank 2, and a closed position, where they operate on the blank segments 4 resting on the guides 14 in order to keep them in the feed plane.

[0117] More specifically, in the example illustrated, the jaws of the locking means 26 are configured to interact with the ledges 15 so as to press the lateral end portions (of the segments 4) of the blank 2 (these end portions being operatively interposed between the jaws 27 and the ledges).

[0118] The jaws 27 are connected to corresponding actuators 28. The actuators 28 (for example, pneumatic) are preferably associated with the guides 14. As regards the gluing nozzles 13 and the supporting and movement system 12 for the nozzles 13, attention is drawn to the following (with reference in particular to Figures 2, 3 and 5).

[0119] In one variant embodiment not illustrated, the locking means 26 are defined by a plate positioned in a zone under the blank 2 and movable vertically, acting in conjunction with the die 8 or other contact member (smaller than the die 8) positioned in the zone above the blank 2 and movable vertically.

[0120] In this solution, the plate and the contact member can be moved towards each other in such a way as to hold in between them a central portion of the base 3 of the blank 2.

[0121] The supporting system 12 for the nozzles 13 preferably comprises a bracket 29 having a first end which can be anchored to the frame of the forming machine 1 or to the supporting structure 11.

[0122] The bracket 29 is positioned relative to the guides 14 in such a way that it rises up (substantially perpendicularly) from the feed plane.

[0123] A rod 32 is movably connected in cantilever fashion to a second end 31 of the bracket 29. The rod 32 is connected to the bracket 29 movably so it can be translated in a predetermined direction parallel to the feed plane (that is, to the plane in which blank 2 lies).

[0124] In the preferred embodiment (illustrated), the supporting and movement system 12 for the nozzles 13 is positioned in such a way that the rod 32 is movable along a transversal direction, that is, a direction perpendicular to the longitudinal direction of movement of the blank 2 along the guides 14. Preferably, the supporting and movement system 12 for the nozzles 13 is positioned laterally of one of the two guides 14.

[0125] The rod 32 is movable in both directions.

[0126] More specifically, the rod 32 is slidably coupled to a guide block 33 fixed to the bracket 29.

[0127] Preferably, the rod 32 is driven by an electric motor 34. Preferably, the rod 32 defines a rack coupled

to the electric motor 34 through the agency of a pinion.

[0128] The nozzles 13 (the at least one nozzle 13) are connected to the free end of the rod 32.

[0129] The nozzles (the at least one nozzle) 13 are inclined with respect to the feed plane (at angles of approximately 45 degrees); preferably, the nozzles are directed in such a way as to converge (in the glue emitting direction). Hence, the nozzle 13 is inclined with respect to the feed plane in such a way as to spread the glue perpendicularly (substantially) perpendicularly to the corresponding oblique face 5 (of the bevelled edge). The nozzles 13 dispense liquid, hot-melt glue of a *per se* known type. Preferably, the nozzles 13 are adjustably mounted on the rod 32 so that their angle of inclination can be varied.

[0130] Preferably, the nozzles 13 are adjustably mounted on the rod 32 so that the distance between the nozzles 13 themselves can be varied.

[0131] In the example illustrated, there is a bar 35 fixed to the free end of the rod 32 and transversely thereto (so that the bar 35 is positioned along the longitudinal direction). The nozzles 13 can be anchored along slots 36 defined by the bar 35 and extending longitudinally.

[0132] The fact that the nozzles 13 are mounted with a variable spacing along an axis parallel to the longitudinal direction of blank 2 feed allows the gluing device 10 to be adapted to blanks 2 of different sizes.

[0133] Operatively, the gluing device 10 according to the invention works as follows.

[0134] A blank 2 (of the type shown in Figures 6 and 7) is coupled to the guides 14 in such a way that lateral end portions of two segments 4 of it (on laterally opposite sides) rest on the (ledges 15 of the) guides 14.

[0135] The blank 2 is fed forward towards a gluing station until it is interposed between the first pushers 18 and the second pushers 19. As it moves, the blank (or more specifically, the segments 4 resting on the guides 14) interacts with the teeth 21 of the second pushers 19, pushing them to a position of non-interference solely under the action of its own passing.

[0136] At this point, the four pushers (the first pushers 18 and the second pushers 19) are moved towards the segments 4 of the blank 2 (the lateral segments 4 resting on the guides) until abutting (when the pushers themselves reach the end of their stroke) against the transversely positioned borders of these segments (this configuration is shown in Figure 8).

[0137] The first pushers 18 and the second pushers 19 advance towards the blank 2 from opposite sides (longitudinally) of the blank 2 itself in order to close it in the middle.

[0138] At this point, the locking means 26 (which up to this moment have been inactive in the position of non-interference with the blank 2) are activated in order to lock the blank at the predetermined longitudinal position reached when the pushers 8, 9 are in abutment against the blank 2.

[0139] As a result of activation of the locking means

26 (the lateral segments 4 of the blank 2 are gripped, so that) the blank 2 is forced to remain in place and in the same plane as the feed plane.

[0140] At this point, the first pushers 18 and the second pushers 19 withdraw longitudinally away from the blank 2 and return to a position of non-interference therewith (this situation is illustrated in Figure 8).

[0141] At this point, the nozzles 13 are moved along the trajectories defined by the oblique faces 5 of the segments 4 and are activated to apply glue at least on a number of oblique faces 5 equal to half the total number of oblique faces 5 of the segments 4, so that for each pair of oblique faces 5 (belonging to different segments 4 and) combining to form an edge of the box sidewall, at least one has glue applied to it.

[0142] Preferably, the nozzles 13 are moved transversely to apply glue to all of the oblique faces 5 which are transversely positioned, while no glue is applied to the oblique faces 5 which are positioned longitudinally. Preferably, the nozzles 13 remain active so as to spread glue also on the oblique faces 6 of the base 3 which are positioned transversely (and which are interposed between the oblique faces 5 of the segments to which glue is also applied) while, preferably, no glue is applied to the oblique faces 6 of the base 3 which are positioned longitudinally.

[0143] This makes the device 10 particularly fast.

[0144] It should be noted that the supporting structure 11 is configured in such a way that the spacing of the guides 14 can be adjusted during initial setting up of the device 10.

[0145] In light of this, the device 10 is preferably configured in such a way that a blank whose base 3 is rectangular in shape is coupled to the guides 14 with the long sides of the base positioned longitudinally.

[0146] This makes the device 10 particularly fast.

[0147] Described below is the procedure (briefly mentioned above) for calibrating, that is, setting up, the positioning means 17.

[0148] First of all, the blank 2 (of the required size for the boxes to be made) is positioned in the gluing station between the first pushers 18 and the second pushers 19.

[0149] Next, the pushers 18 and 19 are extended (to the end of their stroke) and are moved along the guides 14 until the blank 2 is at the required longitudinal position, with the pushers 18 and 19 extended and in abutment against the lateral segments 4 of the blank 2 itself.

[0150] At this point, the pushers 18 and 19 are fixed stably to the guides 14 in such a way that the fixed parts of the pushers (for example, in the case of cylinder and piston assemblies, the cylinders) remain in place during the operation of the device 10.

[0151] This invention therefore also provides a gluing method for applying liquid glue to the blank 2.

[0152] According to the invention, the method comprises the following steps:

- feeding the blank 2 to the gluing station, by making

the blank slide along a longitudinal direction, with lateral end portions of the segments 4 of the blank 2 slidably supported on the guides 14 (positioned longitudinally in the feed plane and spaced from each other to define an empty space between them);

- positioning the blank 2 at a predetermined longitudinal position in the gluing station by a controlled movement of the blank 2 along the longitudinal direction (through the agency of the positioning means 17); this controlled movement of the blank 2 occurs (normally) in the opposite direction to the feed direction;
- locking the blank 2 at the predetermined longitudinal position while keeping it in the same plane as the feed plane (through the agency of the locking means 26);
- moving at least one liquid glue dispensing nozzle 13 along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces 5.

[0153] Preferably, the at least one nozzle 13 (preferably, the pair of nozzles 13) is moved only transversely to the longitudinal direction of blank 2 feed, so that glue is applied only to a subset of the oblique faces 5 defined by the bevelled edges.

[0154] Preferably, the positioning of the blank 2 at the predetermined longitudinal position is accomplished by moving a first pusher 18 and a second pusher 19 longitudinally in opposite directions until the selfsame pushers 18 and 19 reach an extended position where they are in abutment against corresponding borders of the blank 2 segments 4 resting on the guides (the borders being) positioned transversely to the longitudinal direction of blank 2 feed.

[0155] Also, preferably, before the step of moving the at least one liquid glue dispensing nozzle 13 and after the step of locking, the pushers 18 and 19 are moved away from each other to a withdrawn position of non-interference with the blank 2.

[0156] It should be noted that the invention also provides a method for modifying a forming machine 1 to make it suitable for making boxes from special blanks (of the type described above and illustrated in Figures 6 and 7).

[0157] This method comprises providing a gluing device 10 (as described above) and installing it in a forming machine 1 (for example of the traditional type, equipped with stay tape applicators).

[0158] The gluing device 10 is installed in the forming machine 1 in place of the existing blank feed guides. Alternatively, the existing guides may be modified to obtain the supporting structure 11 described above. Whatever the case, the gluing device 10 is installed in the forming machine 1 at a position above a box outfeed station 37 and also above the folding elements (by which the segments 4 of the blank 2 are folded relative to the base 3). Indeed, it is essential for the glue to be applied to the

blank 2 when the latter is still laid out flat, that is to say, before the segments 4 are folded.

5 Claims

1. A gluing device (10) for a box forming machine (1) and configured to apply liquid glue to a flat blank (2) of paper or cardboard having a base (3) and a plurality of segments (4) connected to the base (3) and foldable to form a box sidewall, where the free sides of the segments (4), designed to be joined to form the edges of the box sidewall, are bevelled to define oblique faces (5) contained in the thickness of the segments (4), comprising:

- a supporting structure (11) configured to enable the blank (2) to move in a feed plane along a longitudinal feed direction to convey it to a gluing station;
- at least one liquid glue dispensing nozzle (13) movable along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces (5),

characterized in that the supporting structure (11) comprises:

- a first and a second guide (14) positioned longitudinally in the feed plane and shaped in such a way as to prevent transversal movements of the blank (2) and to slidably support lateral end portions of segments (4) of the blank (2);
- positioning means (17) operating on the blank (2) to move it to a predetermined longitudinal position in the gluing station;
- locking means (26) operating on the blank (2) in order to hold the blank in place in the same plane as the feed plane, while it is in the predetermined longitudinal position,

wherein said at least one liquid glue dispensing nozzle (13) is inclined with respect to the feed plane, in such a way as to spread the glue perpendicularly to said one or more of the oblique faces (5).

2. The device according to claim 1, wherein the first and second guides (14) are spaced from each other to define an empty space between them and comprise ledges (15) lying in the feed plane, for slidably supporting the lateral end portions of the segments (4) of the blank (2), and walls (16) perpendicular to the ledges (15) and configured to laterally delimit a slideway for the blank (2).
3. The device according to claim 1 or 2, wherein the positioning means (17) comprise at least a first and a second pusher (18, 19) associated with the guides

- (14) to interact with corresponding transversely positioned borders of the blank (2) segments (4) resting on the guides (14), the pushers (18, 19) being movable longitudinally between an extended position where they abut against the borders of the blank (2) when the blank (2) is at the predetermined longitudinal position and a withdrawn position where they are away from the blank (2).
4. The device according to claim 3, wherein the pusher (19), positioned upstream relative to the feed direction of the blank (2) along the guides (14), is movable between a first operating position where it is spaced from the feed plane of the blank (2) so as not to interfere with blank feed, and a second operating position where it intersects the feed plane so as to define an abutment for the border of the blank (2).
 5. The device according to any of the preceding claims, wherein the locking means (26) are associated with the guides (14) and define jaws (27) which are movable between an open position of non-interference with the blank (2), and a closed position, where they operate on the blank (2) segments (4) resting on the guides (14) in order to keep them in the feed plane.
 6. The device according to claim 5, wherein the first and second guides (14) comprise ledges (15) lying in the feed plane, for slidably supporting the lateral end portions of the segments (4) of the blank (2), and wherein the jaws (27) of the locking means (26) are configured to interact with the ledges (15) so as to press the lateral end portions of the blank (2) which are operatively interposed between the jaws (27) and the ledges (15).
 7. The device according to any of the preceding claims, wherein the at least one nozzle (13) is positioned, relative to the supporting structure (11), in such a way that the predetermined direction of movement of the nozzle (13) is perpendicular to the longitudinal direction of blank (2) feed defined by the guides (14).
 8. The device according to any of the preceding claims, comprising a pair of nozzles (13) mounted with a variable spacing along an axis parallel to the longitudinal direction of blank (2) feed defined by the guides (14).
 9. A machine (1) for forming boxes of paper or cardboard from flat blanks (2) having a base (3) and a plurality of segments (4) connected to the base (3) and foldable to form a box sidewall, comprising:
 - folding elements operating on the segments (4) of the blank (2) in such a way as to fold them relative to the base (3);
 - presser elements (7) movable towards and away from the box in order to press against the vertical edges of the box sidewall, the edges being formed when corresponding free sides of the folded lateral segments (4) are joined to each other;
 - manipulating means (8, 9) configured to interact with the blank (2) and with the box to impart vertical movements perpendicular to the direction of movement of the presser elements,
- characterized in that** it comprises a gluing device (10) according to any of the preceding claims.
10. The forming machine according to claim 9, comprising stay tapes acting in conjunction with the presser elements (7) to allow strips of the stay tapes to be applied to the vertical edges of the box sidewall in order to seal the edges.
 11. A gluing method for applying liquid glue to a flat blank (2) of paper or cardboard having a base (3) and a plurality of segments (4) connected to the base (3) and foldable to form a box sidewall, where the free sides of the segments (4), designed to be joined to form the edges of the box sidewall, are bevelled to define oblique faces (5) contained in the thickness of the segments (4),

characterized in that it comprises the following steps:

 - feeding a blank (2) to a gluing station, by making the blank slide along a longitudinal direction, with lateral end portions of the segments (4) of the blank (2) slidably supported on a first and a second guide (14) which are positioned longitudinally in the feed plane and which are spaced from each other to define an empty space between them;
 - positioning the blank (2) at a predetermined longitudinal position in the gluing station by a controlled movement of the blank (2) along the longitudinal direction;
 - locking the blank (2) at the predetermined longitudinal position while keeping it in the same plane as the feed plane;
 - moving at least one liquid glue dispensing nozzle (13) along a predetermined direction parallel to the feed plane in such a way as to spread the glue on one or more of the oblique faces (5).
 12. The method according to claim 11, wherein the at least one nozzle (13) is moved only transversely to the longitudinal direction of blank (2) feed, so that glue is applied only to a subset of the oblique faces (5) defined by the bevelled edges.
 13. The method according to claim 11 or 12, wherein the step of positioning the blank (2) at a predetermined

longitudinal position is accomplished by moving at least a first pusher and a second pusher (18, 19) longitudinally in opposite directions until reaching an extended position where the pushers are in abutment against corresponding borders of the blank (2) segments (4) resting on the guides (14), the border being positioned transversely to the longitudinal direction of blank (2) feed, and wherein, before the step of moving the at least one liquid glue dispensing nozzle (13) and after the step of locking, the pushers (18, 19) are moved away from each other to a withdrawn position of non-interference with the at least one nozzle (13).

14. A method for modifying a machine (1) for forming boxes of paper or cardboard, designed to form the boxes from flat blanks (2) having a base (3) and a plurality of segments (4) connected to the base (3) and foldable to form a box sidewall, the machine having:

- folding elements operating on the segments (4) of the blank in such a way as to fold them relative to the base (3);
- presser elements (7) movable towards and away from the box in order to press against the vertical edges of the box sidewall, the edges being formed when the corresponding folded free sides of the segments (4) are joined to each other;
- manipulating means configured to interact with the blank (2) and with the box to impart vertical movements perpendicular to the direction of movement of the presser elements (7),

characterized in that it comprises a step of installing in the machine (1) a gluing device (10) according to any of the claims from 1 to 8, in a zone above the folding elements and the presser elements (7).

Patentansprüche

1. Verleimungsvorrichtung (10) für eine Schachtelformungsmaschine (1), ausgelegt, um flüssigen Leim auf einen flachen Zuschnitt (2) von Papier oder Pappe aufzubringen, aufweisend eine Basis (3) und eine Vielzahl von Segmenten (4), verbunden mit der Basis (3), und faltbar, um eine Schachtelseitenwand zu formen, wobei die freien Seiten der Segmente (4), ausgestaltet, um zusammengefügt zu werden, um die Kanten der Schachtelseitenwand zu formen, abgeschrägt sind, um schräge Flächen (5) zu definieren, enthalten in der Dicke der Segmente (4), umfassend:

- ein Tragegestell (11), ausgelegt, um dem Zuschnitt (2) zu ermöglichen, sich in einer Zufüh-

rungsebene entlang einer Zuführungslängsrichtung zu bewegen, um zur Verleimungsstation befördert zu werden;

- mindestens eine Ausgabedüse für flüssigen Leim (13), die entlang einer vorgegebenen Richtung bewegbar ist, die parallel zur Zuführungsebene verläuft, sodass der Leim auf einer oder mehreren der schrägen Flächen (5) verteilt wird,

dadurch gekennzeichnet, dass das Tragegestell (11) umfasst:

- eine erste und eine zweite Führung (14), positioniert längsseitig in der Zuführungsebene und so ausgebildet, dass Querbewegungen des Zuschnitts (2) vermieden werden und seitliche Endabschnitte von Segmenten (4) des Zuschnitts (2) verschiebbar gestützt werden;
- Positionierungsmittel (17), die auf den Zuschnitt (2) wirken, um diesen zu einer vorgegebenen Längsposition in der Verleimungsstation zu bewegen;
- Spannmittel (26), die auf den Zuschnitt (2) wirken, um den Zuschnitt in derselben Ebene wie die Zuführungsebene an Ort und Stelle zu halten, während er sich in der vorgegebenen Längsposition befindet,

wobei die mindestens eine Ausgabedüse für flüssigen Leim (13) zur Zuführungsebene geneigt ist, sodass der Leim senkrecht zu einer oder mehreren der schrägen Flächen (5) verteilt wird.

2. Vorrichtung nach Anspruch 1, wobei die ersten und die zweiten Führungen (14) voneinander beabstandet sind, um einen Freiraum zwischen ihnen zu bilden und Vorsprünge (15) umfassen, die in der Zuführungsebene liegen, um die seitlichen Endabschnitte der Segmente (4) des Zuschnitts (2) verschiebbar zu stützen, sowie Seitenwände (16), die senkrecht zu den Vorsprüngen (15) angeordnet und ausgelegt sind, um eine Führungsbahn für den Zuschnitt (2) seitlich zu begrenzen.

3. Vorrichtung nach Anspruch 1 oder 2, wobei die Positionierungsmittel (17) mindestens einen ersten und einen zweiten Schieber (18, 19) umfassen, assoziiert mit den Führungen (14), um mit den entsprechenden quer positionierten Rändern der Segmente (4) des Zuschnitts (2) zu interagieren, ruhend auf den Führungen (14), wobei die Schieber (18, 19) längs zwischen einer ausgefahrenen Position, in der sie gegen die Ränder des Zuschnitts (2) anschlagen, wenn sich der Zuschnitt (2) in der vorgegebenen Längsposition befindet, und einer eingefahrenen Position, in der sie vom Zuschnitt (2) weggeführt sind, bewegbar sind.

4. Vorrichtung nach Anspruch 3, wobei der Schieber (19), der stromaufwärts relativ zur Zuführungsrichtung des Zuschnitts (2) entlang den Führungen (14) positioniert ist, zwischen einer ersten Betriebsposition, in der er von der Zuführungsebene des Zuschnitts (2) beabstandet ist, um nicht mit der Zuführung des Zuschnitts zu interferieren, und einer zweiten Betriebsposition, in der er die Zuführungsebene überschneidet, sodass ein Anschlag für den Rand des Zuschnitts (2) definiert wird, bewegbar ist. 5 10
5. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die Spannmittel (26) mit den Führungen (14) assoziiert sind und Einspannbacken (27) definieren, die zwischen einer offenen Position, in der sie nicht mit dem Zuschnitt (2) interferieren, und einer geschlossenen Position, in der sie auf die Segmente (4) des Zuschnitts (2) wirken und auf den Führungen (14) ruhen, um diese in der Zuführungsebene zu halten, bewegbar sind. 15 20
6. Vorrichtung nach Anspruch 5, wobei die ersten und die zweiten Führungen (14) Vorsprünge (15) umfassen, die in der Zuführungsebene liegen, um die seitlichen Endabschnitte der Segmente (4) des Zuschnitts (2) verschiebbar zu stützen, und wobei die Einspannbacken (27) der Spannmittel (26) ausgelegt sind, um mit den Vorsprüngen (15) zu interagieren, sodass die seitlichen Endabschnitte des Zuschnitts (2), die betriebswirksam zwischen den Einspannbacken (27) und den Vorsprüngen (15) eingesetzt sind, gepresst werden. 25 30
7. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die mindestens eine Düse (13) relativ zum Tragegestell (11) so positioniert ist, dass die vorgegebene Bewegungsrichtung der Düse (13) senkrecht zur Längsrichtung der Zuführung des Zuschnitts (2), definiert von den Führungen (14), angeordnet ist. 35 40
8. Vorrichtung nach einem der vorhergehenden Ansprüche, umfassend ein Paar Düsen (13), montiert mit einem variablen Abstand entlang einer Achse, die parallel zur Längsrichtung der Zuführung des Zuschnitts (2), definiert von den Führungen (14), verläuft. 45
9. Maschine (1) zum Formen von Schachteln aus Papier oder Pappe aus flachen Zuschnitten (2), aufweisend eine Basis (3) und eine Vielzahl an Segmenten (4), verbunden mit der Basis (3), und faltbar, um eine Schachtelseitenwand zu formen, umfassend: 50
- Faltelemente, die auf die Segmente (4) des Zuschnitts (2) wirken, sodass diese relativ zur Basis (3) gefaltet werden; 55
 - Presselemente (7), bewegbar hinführend zur
- und wegführend von der Schachtel, um gegen die vertikalen Kanten der Schachtelseitenwand zu pressen, wobei die Kanten geformt werden, wenn entsprechende freie Seiten der gefalteten seitlichen Segmente (4) zusammengefügt werden;
- Handhabungsmittel (8, 9), ausgelegt, um mit dem Zuschnitt (2) und mit der Schachtel zu interagieren, um vertikale Bewegungen zu verleihen, die senkrecht zur Bewegungsrichtung der Presselemente verlaufen,
- dadurch gekennzeichnet, dass** sie eine Verleimungsvorrichtung (10) nach einem der vorhergehenden Ansprüche umfasst.
10. Formungsmaschine nach Anspruch 9, umfassend Haltebänder, agierend in Verbindung mit den Presselementen (7), um Streifen von Haltebändern zu erlauben, an den vertikalen Kanten der Schachtelseitenwand angebracht zu werden, um die Kanten zu versiegeln.
11. Verleimungsverfahren zum Aufbringen von flüssigem Leim auf einen flachen Zuschnitt (2) von Papier oder Pappe aufzubringen, aufweisend eine Basis (3) und eine Vielzahl von Segmenten (4), verbunden mit der Basis (3), und faltbar, um eine Schachtelseitenwand zu formen, wobei die freien Seiten der Segmente (4), ausgestaltet, um zusammengefügt zu werden, um die Kanten der Schachtelseitenwand zu formen, abgeschrägt sind, um schräge Flächen (5) zu definieren, enthalten in der Dicke der Segmente (4),
dadurch gekennzeichnet, dass es folgende Schritte umfasst:
- Zuführen eines Zuschnitts (2) zu einer Verleimungsstation, indem der Zuschnitt entlang einer Längsrichtung verschoben wird, wobei die seitlichen Endabschnitte der Segmente (4) des Zuschnitts (2) verschiebbar auf einer ersten und einer zweiten Führung (14) gestützt werden, die längs in der Zuführungsebene positioniert sind und die voneinander beabstandet sind, um einen Freiraum zwischen ihnen zu definieren;
 - Positionieren des Zuschnitts (2) an einer vorgegebenen Längsposition in der Verleimungsstation durch eine kontrollierte Bewegung des Zuschnitts (2) entlang der Längsrichtung;
 - Einspannen des Zuschnitts (2) an der vorgegebenen Längsposition, während dieser auf derselben Ebene wie die Zuführungsebene beibehalten wird;
 - Bewegen mindestens einer Ausgabedüse für flüssigen Leim (13) entlang einer vorgegebenen Richtung, die parallel zur Zuführungsebene verläuft, sodass der Leim auf einer oder mehreren

der schrägen Flächen (5) verteilt wird.

12. Verfahren nach Anspruch 11, wobei die mindestens eine Düse (13) nur quer zur Längsrichtung der Zuführung des Zuschnitts (2) bewegt wird, sodass der Leim nur auf einer Untergruppe der schrägen Flächen (5) aufgebracht wird, definiert durch die abgeschrägten Kanten.
13. Verfahren nach Anspruch 11 oder 12, wobei der Schritt zum Positionieren des Zuschnitts (2) an einer vorgegebenen Längsposition erfolgt, indem mindestens ein erster Schieber und ein zweiter Schieber (18, 19) längs in entgegengesetzte Richtungen bewegt werden, bis eine ausgefahrene Position erreicht wird, in der die Schieber gegen entsprechende Ränder der Segmente (4) des Zuschnitts (2) anschlagen und auf den Führungen (14) ruhen, wobei der Rand quer zur Längsrichtung der Zuführung des Zuschnitts (2) positioniert wird und wobei die Schieber (18, 19) vor dem Schritt zum Bewegen der mindestens einen Ausgabdüse für flüssigen Leim (13) und nach dem Schritt zum Einspannen voneinander wegführend in eine eingefahrene Position bewegt werden, in der sie nicht mit der mindestens einen Düse (13) interferieren.
14. Verfahren zum Modifizieren einer Maschine (1) zum Formen von Schachteln aus Papier oder Pappe, ausgestaltet, um die Schachteln aus flachen Zuschnitten (2) zu formen, aufweisend eine Basis (3) und eine Vielzahl an Segmenten (4), verbunden mit der Basis (3), und faltbar, um eine Schachtelseitenwand zu bilden, wobei die Maschine aufweist:
- Faltelemente, die auf die Segmente (4) des Zuschnitts wirken, sodass diese relativ zur Basis (3) gefaltet werden;
 - Presselemente (7), bewegbar hinführend zur und wegführend von der Schachtel, um gegen die vertikalen Kanten der Schachtelseitenwand zu pressen, wobei die Kanten geformt werden, wenn die entsprechenden gefalteten freien Seiten der Segmente (4) zusammengefügt werden;
 - Handhabungsmittel, ausgelegt, um mit dem Zuschnitt (2) und mit der Schachtel zu interagieren, um vertikale Bewegungen zu verleihen, die senkrecht zur Bewegungsrichtung der Presselemente (7) verlaufen,
- dadurch gekennzeichnet, dass** es einen Schritt zum Installieren einer Verleimungsvorrichtung (10) nach einem der Ansprüche 1 bis 8 in der Maschine (1) in einer Zone oberhalb der Faltelemente und der Presselemente (7) umfasst.

Revendications

1. Dispositif de collage (10) pour une machine de formation des boîtes (1) et configuré pour appliquer une colle liquide sur une ébauche plate (2) en papier ou en carton comportant une base (3) et une pluralité de segments (4) reliés à la base (3) et pouvant se plier pour former une cloison latérale de boîte, dans lequel les côtés libres des segments (4), conçus pour être reliés pour former les bords de la cloison latérale de boîte, sont biseautés pour définir des faces obliques (5) contenues dans l'épaisseur des segments (4), comprenant :
- une structure de support (11) configurée pour permettre à l'ébauche (2) de se déplacer dans un plan d'acheminement le long d'une direction d'acheminement longitudinale pour la convoier vers un poste de collage ;
 - au moins une buse de distribution de colle liquide (13) mobile le long d'une direction prédéfinie parallèle au plan d'acheminement de manière à étaler la colle sur une ou plusieurs faces obliques (5),
- caractérisé en ce que** la structure de support (11) comprend :
- un premier et un second guide (14) positionnés longitudinalement dans le plan d'acheminement et ayant une forme qui permette d'empêcher les déplacements transversaux de l'ébauche (2) et de supporter de façon coulissante des parties terminales latérales de segments (4) de l'ébauche (2) ;
 - des moyens de positionnement (17) opérant sur l'ébauche (2) pour la déplacer dans une position longitudinale prédéfinie dans le poste de collage ;
 - des moyens de blocage (26) opérant sur l'ébauche (2) afin de maintenir l'ébauche en place dans le même plan que celui d'acheminement lorsqu'elle se trouve dans la position longitudinale prédéfinie,
- dans laquelle ladite au moins une buse de distribution de colle liquide (13) est inclinée par rapport au plan d'acheminement de manière à étaler la colle perpendiculairement auxdites une ou plusieurs faces obliques (5).
2. Dispositif selon la revendication 1, dans lequel les premier et second guides (14) sont espacés l'un de l'autre pour définir un espace vide entre eux et comprennent des rebords (15), en position d'appui dans le plan d'acheminement, pour supporter de façon coulissante les parties terminales latérales des segments (4) de l'ébauche (2), et des cloisons (16) per-

- pendiculaires aux rebords (15) et configurées pour délimiter latéralement une glissière pour l'ébauche (2).
3. Dispositif selon la revendication 1 ou 2, dans lequel les moyens de positionnement (17) comprennent au moins un premier et un second poussoir (18, 19) associés aux guides (14) pour interagir avec des bordures correspondantes placées transversalement des segments (4) de l'ébauche (2) en position d'appui sur les guides (14), les poussoirs (18, 19) étant mobiles longitudinalement entre une position développée où ils se mettent en butée contre les bordures de l'ébauche (2), lorsque l'ébauche (2) se trouve dans la position longitudinale prédéfinie, et une position rétractée où ils sont éloignés de l'ébauche (2).
 4. Dispositif selon la revendication 3, dans lequel le poussoir (19), positionné en amont par rapport à la direction d'acheminement de l'ébauche (2) le long des guides (14), est mobile entre une première position de fonctionnement où il est espacé du plan d'acheminement de l'ébauche (2), de manière à ne pas interférer avec l'acheminement de l'ébauche, et une seconde position de fonctionnement où il croise le plan d'acheminement de manière à définir une butée pour la bordure de l'ébauche (2).
 5. Dispositif selon l'une quelconque des revendications précédentes, dans lequel les moyens de verrouillage (26) sont associés aux guides (14) et définissent des mâchoires (27) étant mobiles entre une position d'ouverture de non-interférence avec l'ébauche (2), et une position de fermeture, où ils opèrent sur les segments (4) de l'ébauche (2) en position d'appui sur les guides (14) afin de les maintenir dans le plan d'acheminement.
 6. Dispositif selon la revendication 5, dans lequel les premier et second guides (14) comprennent des rebords (15), en position d'appui dans le plan d'acheminement, pour supporter de façon coulissante les parties terminales latérales des segments (4) de l'ébauche (2), et dans lequel les mâchoires (27) des moyens de blocage (26) sont configurés pour interagir avec les rebords (15) de manière à presser les parties terminales latérales de l'ébauche (2) étant fonctionnellement interposées entre les mâchoires (27) et les rebords (15).
 7. Dispositif selon l'une quelconque des revendications précédentes, dans lequel l'au moins une buse (13) est placée, par rapport à la structure de support (11), de manière à ce que la direction prédéfinie de mouvement de la buse (13) soit perpendiculaire à la direction longitudinale d'acheminement de l'ébauche (2) définie par les guides (14).
 8. Dispositif selon l'une quelconque des revendications précédentes, comprenant une paire de buses (13) montée avec un espacement variable le long d'un axe parallèle à la direction longitudinale d'acheminement de l'ébauche (2) définie par les guides (14).
 9. Machine (1) de formation des boîtes en papier ou en carton à partir d'ébauches plates (2) comportant une base (3) et une pluralité de segments (4) reliés à la base (3) et pliables pour former une cloison latérale de boîte, comprenant :
 - des éléments de pliage opérant sur les segments (4) de l'ébauche (2) de manière à les plier par rapport à la base (3) ;
 - des éléments presseurs (7) pouvant se rapprocher et s'éloigner de la boîte afin de se presser contre les bords verticaux de la cloison latérale de la boîte, les bords étant formés lorsque des côtés libres correspondants des segments latéraux pliés (4) sont joints les uns aux autres ;
 - des moyens de manipulation (8, 9) configurés pour interagir avec l'ébauche (2) et avec la boîte pour conférer des mouvements verticaux perpendiculaires à la direction de mouvement des éléments presseurs,

caractérisée en ce qu'elle comprend un dispositif de collage (10) selon l'une quelconque des revendications précédentes.
 10. Machine de formation selon la revendication 9, comprenant des rubans d'arrêt agissant conjointement avec les éléments presseurs (7) pour permettre aux bandes des rubans d'arrêt d'être appliquées aux bords verticaux de la paroi latérale de la boîte afin de sceller les bords.
 11. Procédé de collage pour appliquer une colle liquide à une ébauche plate (2) de papier ou de carton comportant une base (3) et une pluralité de segments (4) reliés à la base (3) et pouvant se plier pour former une cloison latérale de boîte, dans lequel les côtés libres des segments (4), conçus pour être reliés pour former les bords de la cloison latérale de la boîte, sont biseautés pour définir des faces obliques (5) contenues dans l'épaisseur des segments (4), **caractérisé en ce qu'il** comprend les étapes suivantes :
 - acheminer une ébauche (2) à un poste de collage en faisant coulisser l'ébauche le long d'une direction longitudinale, avec des parties terminales latérales des segments (4) de l'ébauche (2) supportées de façon coulissante sur un premier et un second guide (14) étant positionnés longitudinalement dans le plan d'acheminement et étant espacés l'un de l'autre pour définir un

espace vide entre eux ;

- placer l'ébauche (2) dans une position longitudinale prédéfinie dans le poste de collage par un déplacement contrôlé de l'ébauche (2) le long de la direction longitudinale ;

- bloquer l'ébauche (2) à la position longitudinale prédéfinie tout en la maintenant dans le même plan que le plan d'acheminement ;

- déplacer au moins une buse de distribution de colle liquide (13) le long d'une direction prédéfinie parallèle au plan d'acheminement de manière à étaler la colle sur une ou plusieurs des faces obliques (5).

culaires à la direction de mouvement des éléments presseurs (7),

caractérisé en ce qu'il comprend une étape consistant à installer dans la machine (1) un dispositif de collage (10) selon l'une quelconque des revendications de 1 à 8, dans une zone située au-dessus des éléments de pliage et des éléments presseurs (7).

12. Procédé selon la revendication 11, dans lequel l'au moins une buse (13) est uniquement déplacé transversalement à la direction longitudinale d'acheminement de l'ébauche (2) de manière à ce que la colle soit uniquement appliqué à un sous-ensemble de faces obliques (5) définies par les bords biseautés.

13. Procédé selon la revendication 11 ou 12, dans lequel l'étape consistant à placer l'ébauche (2) à une position longitudinale prédéfinie est réalisée en déplaçant au moins un premier poussoir et un second poussoir (18, 19) longitudinalement dans des directions opposées jusqu'à atteindre une position développée où les poussoirs viennent se mettre en butée contre des bordures correspondantes des segments (4) de l'ébauche (2) en position d'appui sur les guides (14), la bordure étant positionnée transversalement à la direction longitudinale d'acheminement de l'ébauche (2), et dans lequel, avant l'étape consistant à déplacer l'au moins une buse de distribution de colle liquide (13) et après l'étape de blocage, les poussoirs (18, 19) sont éloignés réciproquement à une position rétractée de non-interférence avec l'au moins une buse (13).

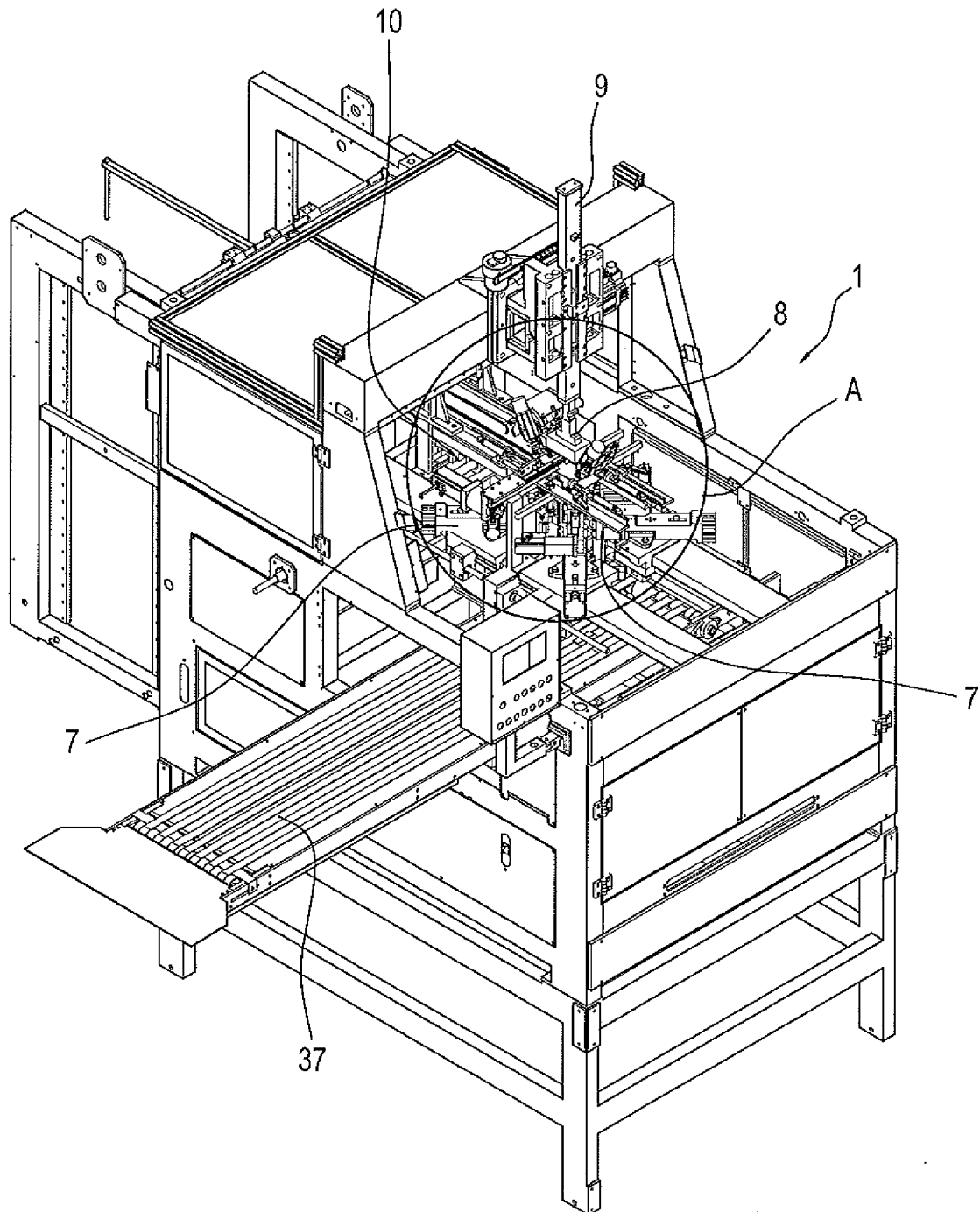
14. Procédé destiné à modifier une machine (1) de formation des boîtes en papier ou en carton, conçu pour former les boîtes à partir d'ébauches plates (2) comportant une base (3) et une pluralité de segments (4) reliés à la base (3) et pliables pour former une cloison latérale de boîte, la machine comportant :

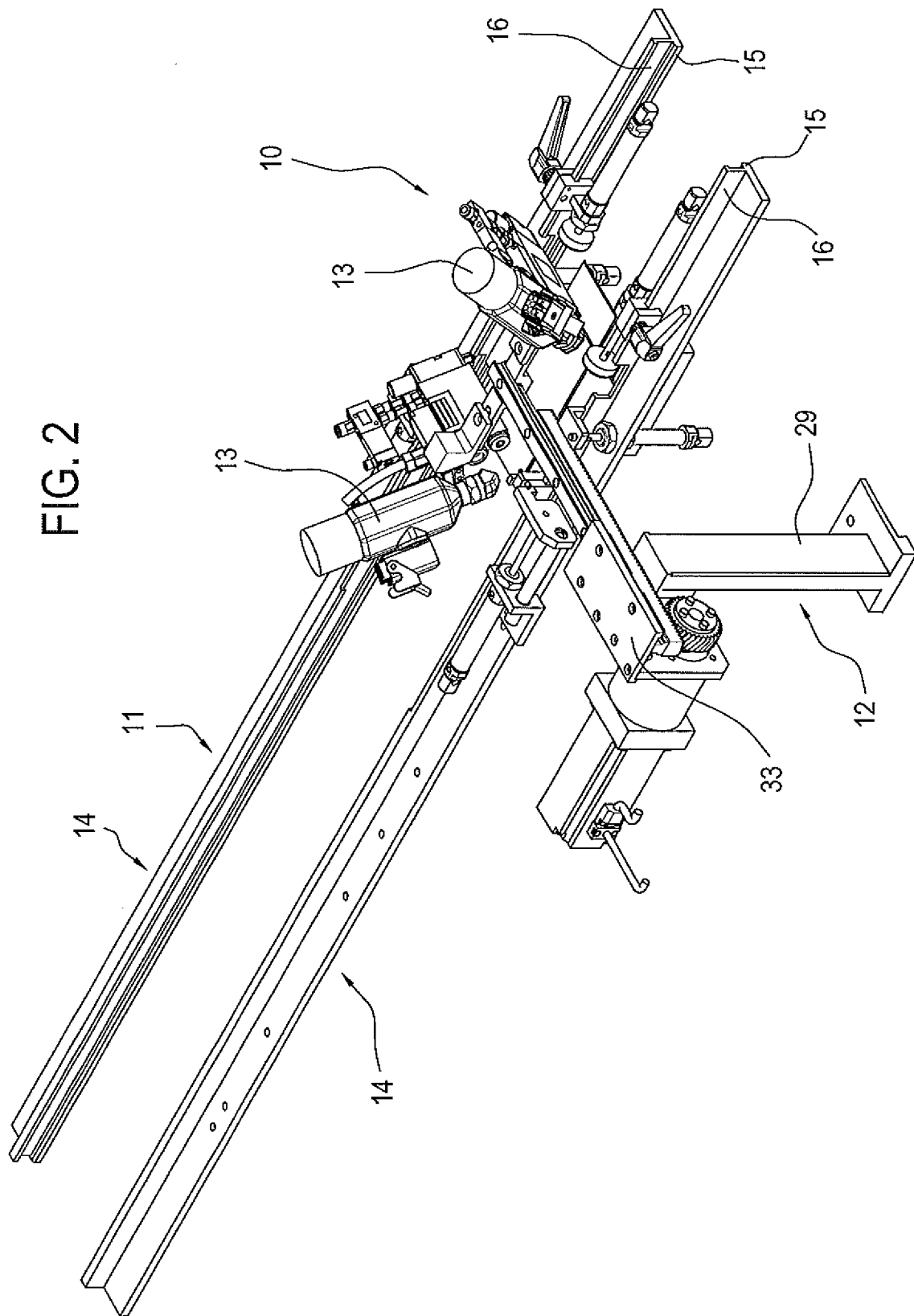
- des éléments de pliage opérant sur les segments (4) de l'ébauche de manière à les plier par rapport à la base (3) ;

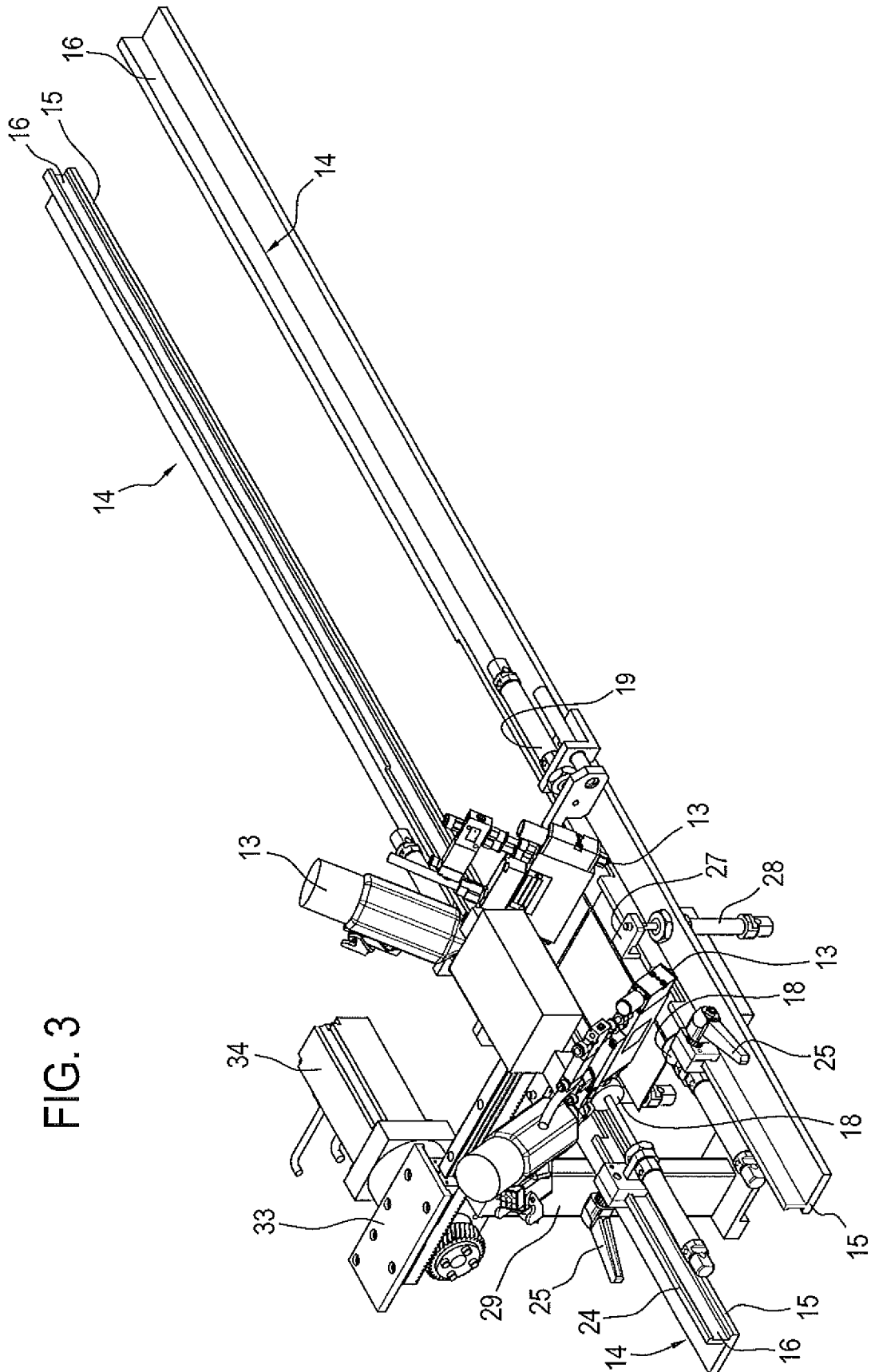
- des éléments presseurs (7) pouvant se rapprocher et s'éloigner de la boîte afin de se presser contre des bords verticaux de la cloison latérale de la boîte, les bords étant formés lorsque les côtés libres pliés correspondants des segments (4) sont joints les uns aux autres ;

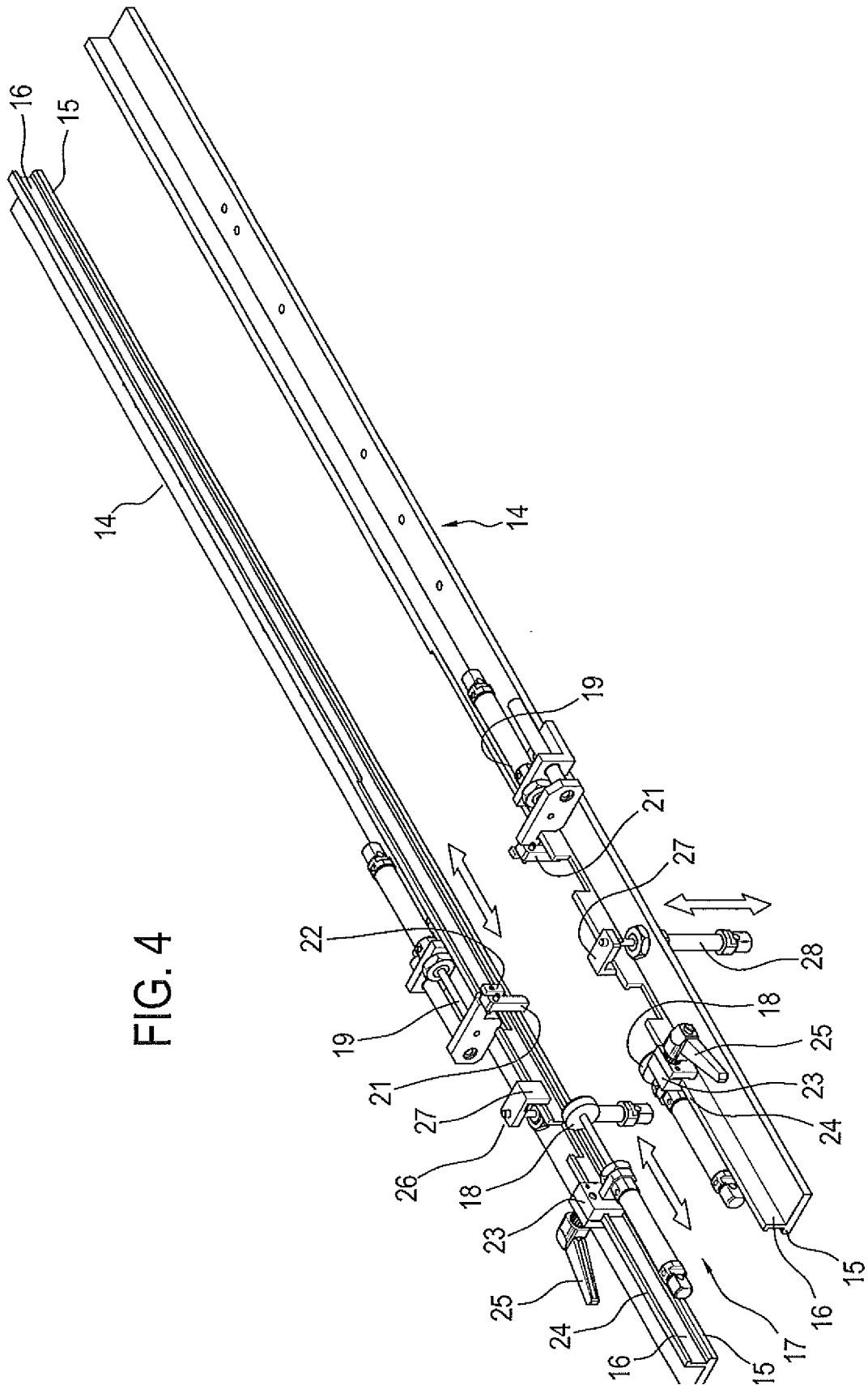
- des moyens de manipulation configurés pour interagir avec l'ébauche (2) et avec la boîte pour conférer des mouvements verticaux perpendi-

FIG. 1









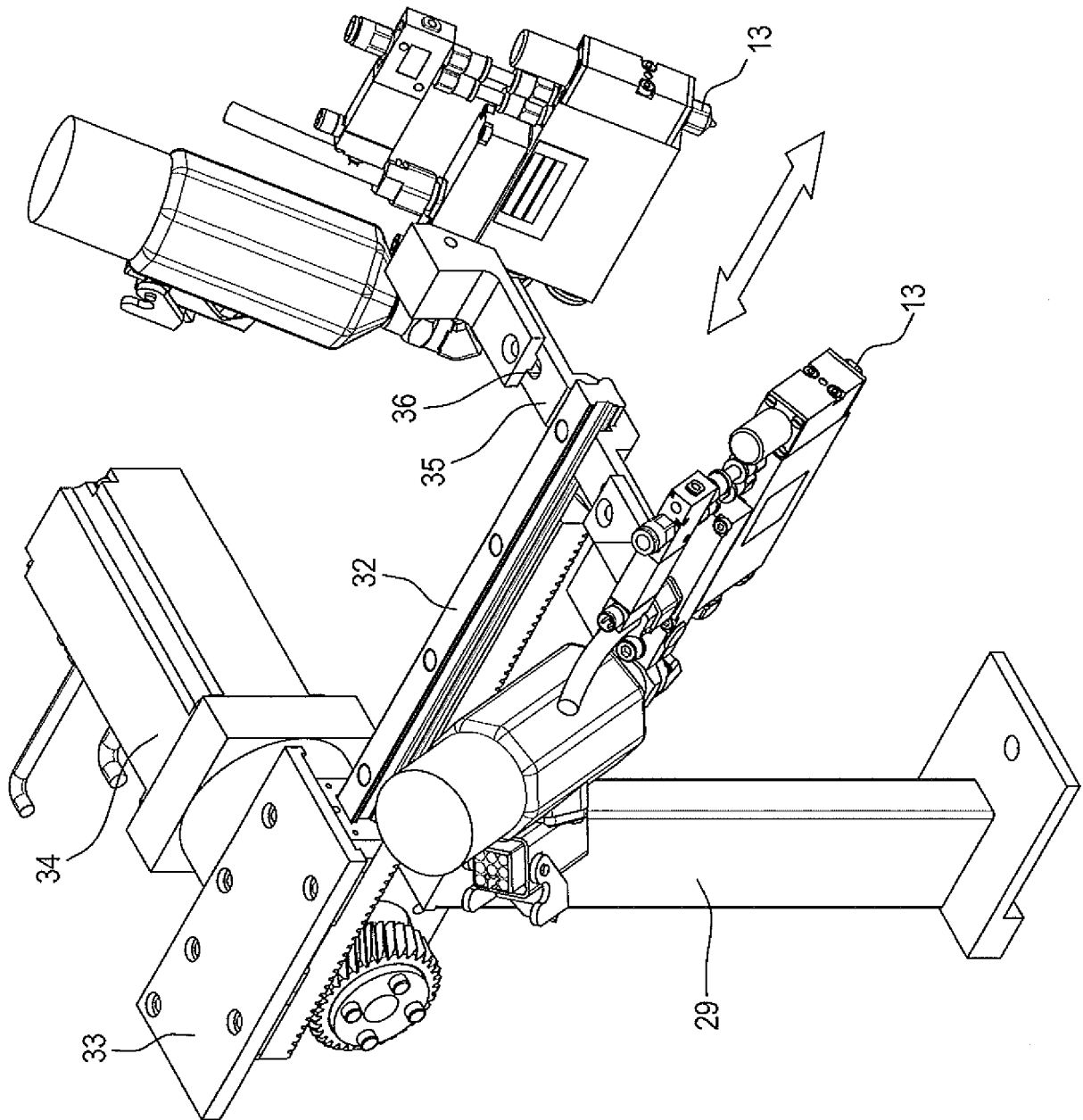


FIG. 5

FIG. 6

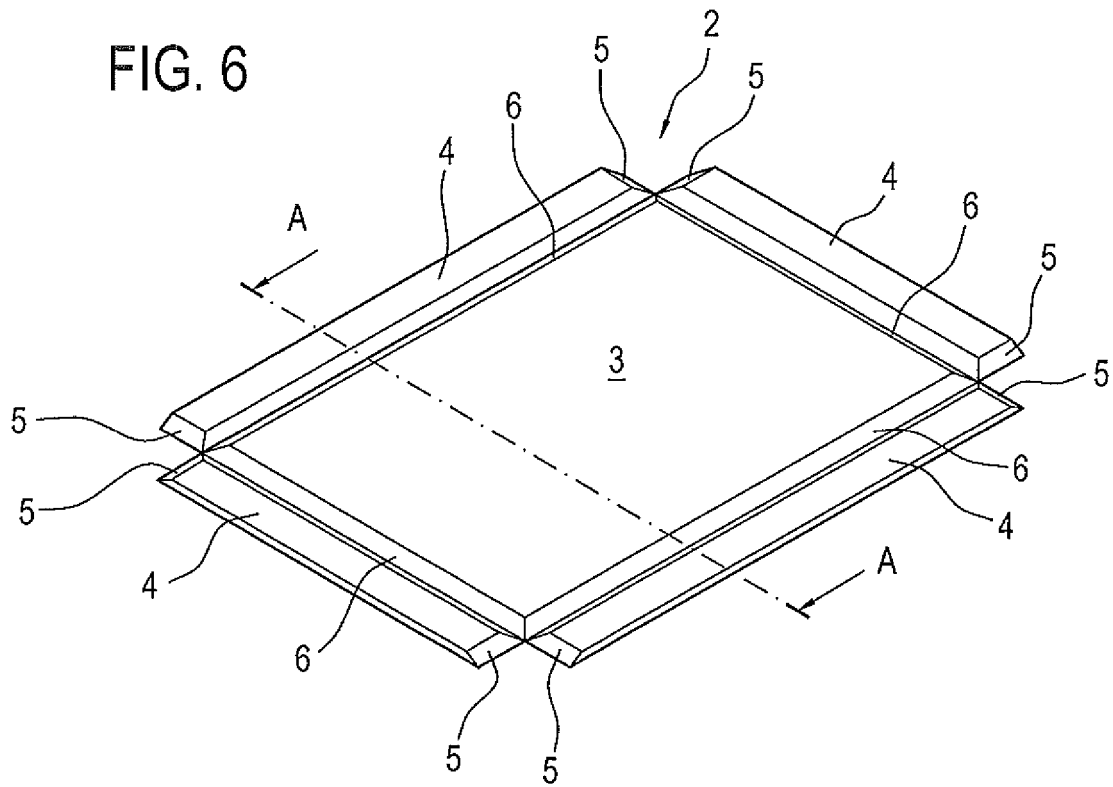
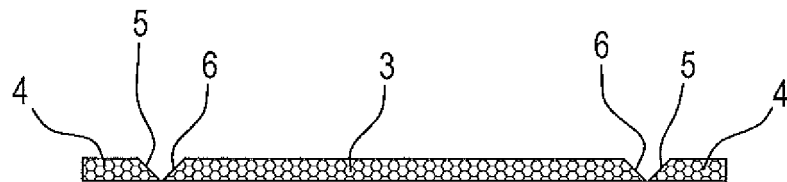


FIG. 7



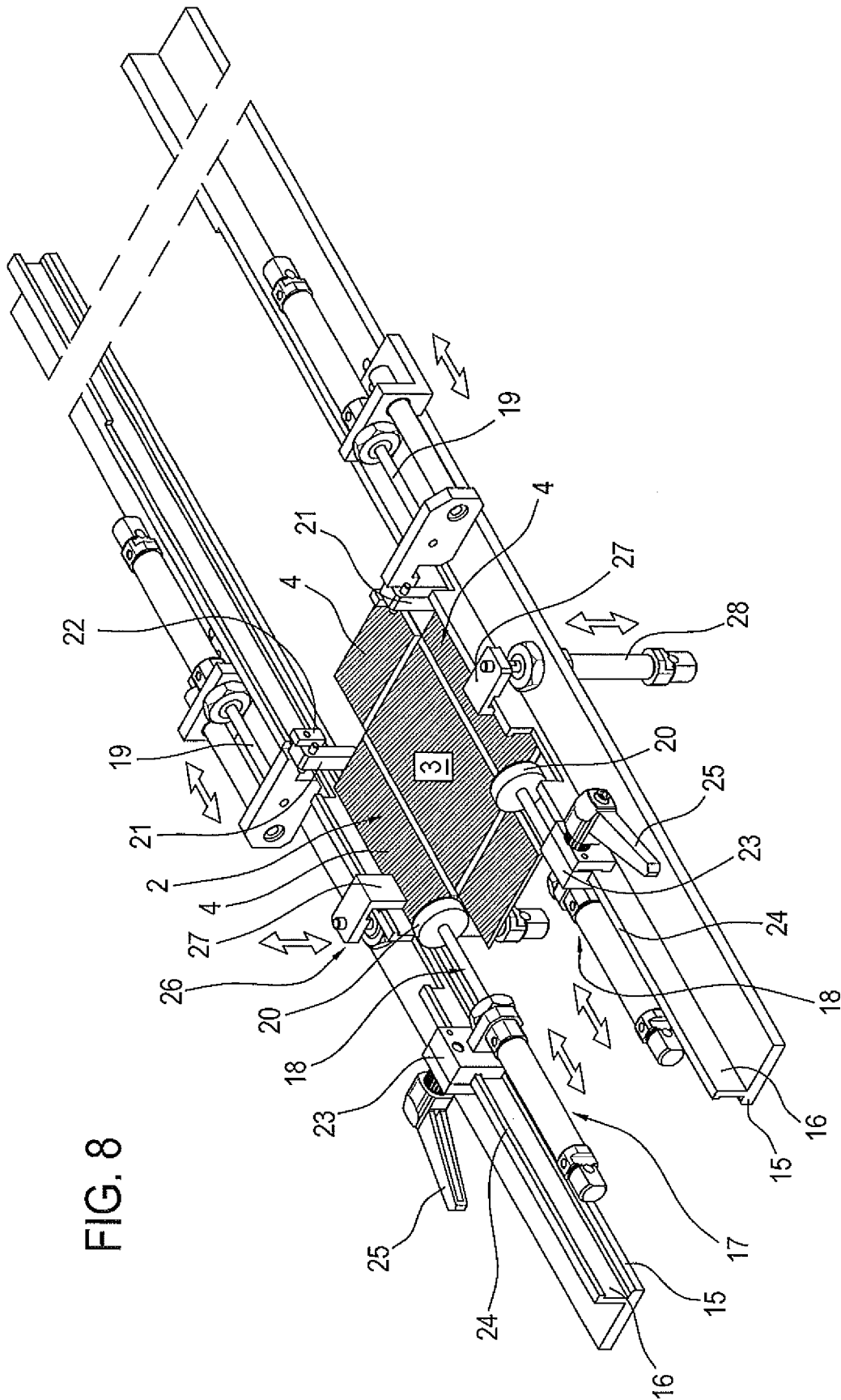


FIG. 8

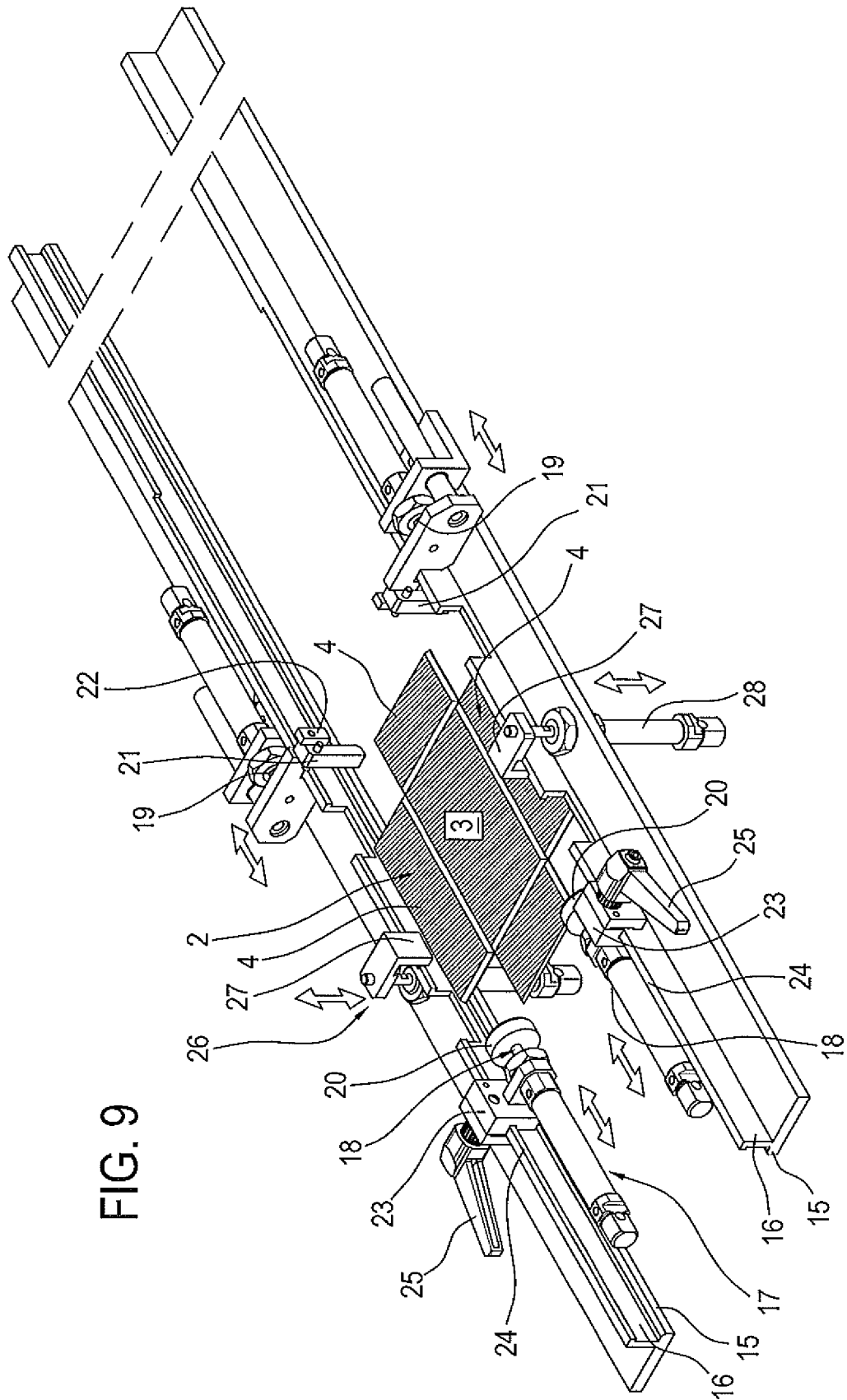


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2007129201 A [0019]
- WO 2009090481 A2 [0022]
- US 6029884 A [0027] [0032]
- US 2007199648 A [0034]