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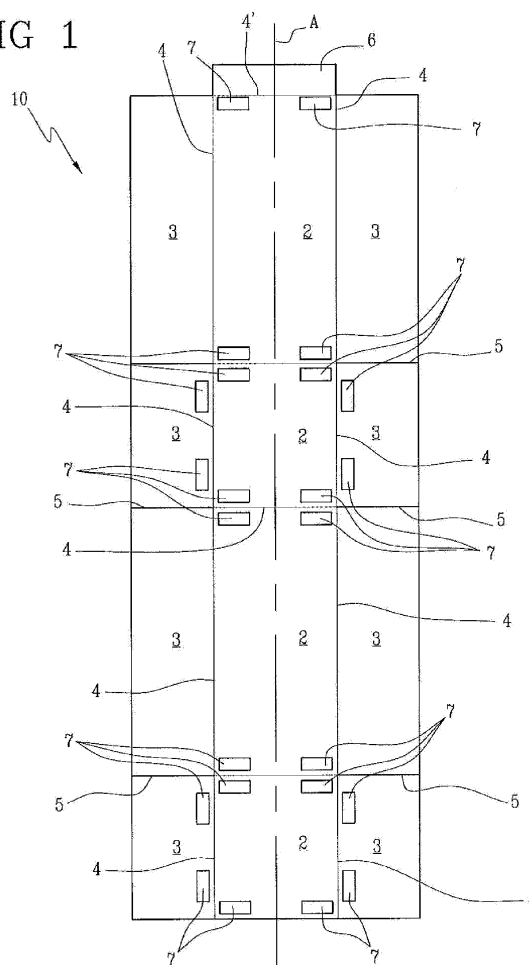
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(54) **Blank for making a cardboard box, and machine and method for making it**

(57) A blank for making a cardboard box comprises a plurality of panels (2, 3), each at least partly forming a wall of the box (40), the panels (2, 3) being separated in pairs by respective crease lines (4) or cut lines (5) and a plurality of spacer elements (7) located in corners of the panels (2, 3) close to respective crease lines (4).

FIG 1



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Description

[0001] This invention relates to a blank for making a cardboard box, a machine for making the blank and a method for making the blank.

[0002] More specifically, this invention is applicable to the production of cardboard shipping and pallet boxes for use in the packaging of products.

[0003] Prior art packaging boxes are made from blanks cut out in the required shape from sheets of cardboard. Each blank is then folded and fixed to form a box.

[0004] Further, the blank has a series of crease lines and cut lines made on it which define a plurality of distinct panels.

[0005] Each panel of the blank is thus separated from one or more adjacent panels by a crease line or a cut line.

[0006] The panels, each by itself or in conjunction with others, form the walls of the box.

[0007] In more detail, and with reference to common, parallelepiped shaped boxes, the blank comprises four central panels aligned along a reference direction and connected to each other by respective crease lines. Each central panel by itself forms a respective side wall of the box.

[0008] The blank also comprises a plurality of lateral panels, connected laterally in pairs on opposite sides of each central panel. Each lateral panel is separated from the lateral panel adjacent to it by cut lines so that each lateral panel can rotate relative to the respective central panel about the crease line independently of the other lateral panels.

[0009] In the finished box, the lateral panels are folded in pairs, one over the other, to form a base wall and a top wall of the box.

[0010] For containing an object in the box, filling elements are used which are at least partly shaped to match the object to be contained and the space inside the box, and which are interposed between the object and the box. That way, when the object is inside the box, the object is held securely in place relative to the latter so it does not move during transportation and handling, thereby preventing damage. It should be noted that the filler elements, which are made of polystyrene, besides holding the object in place, also absorb the shocks that could damage the object.

[0011] Disadvantageously, these filling elements are cumbersome and inconvenient because they must be stored separately. Moreover, the application of the fillers is laborious because often they must be applied to the object before it is inserted into the box, with the risk that, while this is being done, the fillers themselves will become detached or misaligned relative to the object.

[0012] Moreover, the prior art boxes and the filling elements described create waste disposal problems. Indeed, as mentioned above, the fillers are made from polystyrene and must be kept separate from the box, which is made of cardboard, in order to comply with legislation on waste disposal and recycling.

[0013] In this context, the technical purpose which forms the basis of this invention is to propose a blank for making a cardboard box, a machine capable of making the blank and a method for making the blank, which can overcome the above mentioned disadvantages of the prior art.

[0014] More specifically, this invention has for an aim to provide a machine for making a cardboard box blank which allows an object to be packed safely, quickly and easily, a method for making the blank and the blank itself.

[0015] Another aim of this invention is to provide a machine for making a box blank, a method for making the blank and the blank which considerably simplify the box waste disposal process.

[0016] The technical purpose and aims specified are substantially achieved by a blank for making a cardboard box, a machine for making the blank and a related production method, comprising the technical features set out in one or more of the appended claims.

[0017] Further features and advantages of this invention are more apparent in the detailed description below, with reference to a preferred, but non-exclusive embodiment of a blank for making a cardboard box, a method for making the blank and machine for making the blank, as illustrated in the accompanying drawings, in which:

- Figure 1 is a plan view of a first embodiment of a blank according to the invention;
- Figure 2 is a plan view of a second embodiment of the blank according to the invention;
- Figure 3 is a perspective view of a detail of a box made from the blank of Figure 1;
- Figure 4 is a side view of a detail of a machine for making the blank of Figure 1;
- Figure 5 is a view of the detail of Figure 4 through a section line V-V of Figure 4;
- Figure 6 is a view of the detail of Figure 4 through a section line VI-VI of Figure 4;
- Figure 7 is a front view of the detail of the machine of Figure 4;
- Figure 8 is a schematic side elevation view of a machine for making blanks according to this invention;
- Figures 9 and 10 are respective schematic side elevation views showing the machine of Figure 8 in two different successive operating steps;
- Figure 11 is a schematic top plan view of the machine of Figure 10;
- Figures 12 to 14 are scaled up views of respective details enclosed in frames labelled A, B and C in Figures 8 to 10, respectively;
- Figure 15 is a schematic top plan view of another embodiment of the machine for making blanks illustrated in the figures listed above;
- Figures 16 and 17 are respective schematic side elevation views showing the machine of Figure 15 in two different successive operating steps.

[0018] With reference to the accompanying drawings,

the numeral 1 denotes in its entirety a blank for making a cardboard box according to this invention.

[0019] More specifically, this invention relates to the production of corrugated cardboard shipping or pallet boxes of the "slotted" or "folder" type for packaging and transporting objects such as, for example, furniture parts.

[0020] The blank 1, made of cardboard, comprises a plurality of panels 2, 3, each of which, by itself or in conjunction with others, forms walls 41, 42 of a cardboard box 40 once the blank 1 has been folded and, if necessary, sealed to form the box 40.

[0021] The blank 1 also has a plurality of crease lines 4 and cut lines 5 which define the panels 2, 3. In other words, the panels 2, 3 are separated from each other in pairs by a crease line 4 or by a cut line 5.

[0022] It should be noted that once box 40 has been erected, each of the crease lines 4 forms a corresponding edge 43 of the box 40.

[0023] In more detail, the blank 1 comprises a plurality of central panels 2 connected to each other by respective crease lines 4 and aligned along a reference direction "A". The central panels 2 correspond to side walls 41 of the box 40 once erected.

[0024] The blank 1 also comprises a plurality of lateral panels 3 connected by crease lines 4 to the central panels 2. More in detail, two lateral panels 3 are laterally connected to each central panel 2 by two respective crease lines 4.

[0025] The lateral panels 3 are thus lined up in two distinct, parallel rows on each side of the central panels 2. The lateral panels 3 are separated from each other by respective cut lines 5. The lateral panels 3 form, in conjunction with each other, the base walls 43 of the box 40.

[0026] In the embodiments illustrated, the panels 2, 3 are substantially rectangular in shape. More in detail, in the embodiments illustrated, the blank 1 comprises four central panels 2 and eight lateral panels 3 to form a substantially parallelepiped shaped box 40.

[0027] In the embodiment of Figure 1, the blank 1 is made as a single piece. In this case, the blank 1 also comprises a coupling tab 6 connected to a central panel 2 by a further crease line 4' and aligned with the central panels 2 along the reference direction "A".

[0028] During erection of the box 40, the coupling tab 6 is fixed to the central panel 2 opposite the one it is connected to so as to hold the box 40 in shape. Fixing may be accomplished by gluing, stapling or other method. In the embodiment of Figure 2, on the other hand, the blank 1 is made in two separate pieces 1a, 1b. As illustrated, a first piece 1a comprises only one central panel 2 and two lateral panels 3 connected thereto, whilst a second piece 1b comprises the other central panels 2 connected to the other lateral panels 3 and aligned along the reference direction "A".

[0029] In this case, the blank 1 comprises two coupling tabs 6 forming part of the first piece 1a and connected to the central panel 2 by two further crease lines 4. These coupling tabs 6, once fixed to the central panels 2 of the

second piece 1b are used to connect the first piece 1a and the second piece 1b to each other when the box 40 is erected.

[0030] According to this invention, the blank 1 comprises a plurality of spacer elements 7 located at least in the corners of the panels 2, 3 close to the respective crease lines 4. That way, when the box 40 is erected, the spacer elements 7 are located at least in respective inside corners 44 of the box 40. In other words, the spacer elements 7 constitute spacers in all the corners 44 of the box 40 so that when an object to be packaged is inserted into the box 40, it is held securely in the correct position.

[0031] Advantageously, the spacer elements 7 occupy portions of the panels 2, 3 which, once the box 40 has been erected, form an inside surface 41a, 42a of the walls 41, 42 of the box 40.

[0032] In the embodiments described, the spacer elements 7 are located in all four corners at least of each central panel 2. In effect, it should be noted that the entire surface of each central panel 2 forms an entire corresponding inside surface 41a of the side walls 41 of the box 40.

[0033] The lateral panels 3, on the other hand, during erection of the box 40, are folded over each other about the respective crease lines 4 to form the base walls 42. Some of the lateral panels 3, therefore, comprise portions which are superposed over other lateral panels 3 and thus do not form any inside surface of the walls 41, 42. The spacer elements 7 are not applied to the superposed portions since they would be interposed between adjacent lateral panels 3 and would not allow the lateral panels 3 themselves to be closed properly.

[0034] In other words, at each zone of the blank 1 where three crease lines 4 meet, there are three distinct spacer elements 7 applied to each of three distinct panels 2, 3.

[0035] It should be noted that the spacer elements 7 might also be applied along the crease lines 4 away from the corners of the panels 2, 3.

[0036] According to other embodiments, which are not illustrated, the spacer elements 7 might also be located in central zones of the panels 2, 3 in addition to those located in the corners of the panels 2, 3.

[0037] Positioning the spacer elements 7 in central zones of the panels 2, 3 advantageously improves the protection afforded to the objects placed inside the boxes, in particular when the panels 2, 3 are large in size and subject to bending at the parts of them furthest from the corners.

[0038] As illustrated, the spacer elements 7 are plates made of cardboard and substantially rectangular in shape. Preferably, each of the spacer elements 7 is positioned in such a way that one side of it is parallel to the crease line 4 next to which it is positioned.

[0039] More specifically, each spacer element 7 is fixed to the respective panel 2, 3 in such a way that the distance between that side of it and the crease line 4 next to which it is positioned is between 20 mm and 30 mm.

[0040] More in detail, each spacer element 7 has a long side whose length is between 135 mm and 165 mm, preferably between 142 mm and 158 mm, and a short side whose length is between 50 mm and 70 mm, preferably between 55 mm and 70 mm.

[0041] Further, each spacer element 7 has a thickness of between 8 mm and 20 mm. In an embodiment not illustrated, the spacer elements 7 are stacked and fixed on top of each other in such a way as to reach a desired thickness.

[0042] Advantageously, the spacer elements 7 are made of corrugated cardboard or honeycomb paper material. That way, the spacer elements 7, besides holding the packaged object securely in the correct position, protect the object against shocks that might damage it.

[0043] A further object of this invention is a method for making the blank 1.

[0044] After preparing a sheet of cardboard, preferably corrugated, the latter is cut into the shape of the blank 1.

[0045] According to the embodiment of Figure 1, this operation is performed by cutting out a single piece, whereas, with reference to the embodiment of Figure 2, it is performed by cutting out the two separate pieces 1a, 1b of the blank 1.

[0046] Next, a plurality of crease lines 4 and cut lines 5 are made, so as to form the panels 2, 3. The crease lines 4 are made by a process known as creasing.

[0047] At this point, the plurality of spacer elements 7 are made and then applied to the panels 2, 3 along the crease lines 4 and in the corners of the panels 2, 3. For making the spacer elements 7, the first step is to prepare a cardboard slab 8. Preferably, the slab 8 is made of corrugated cardboard or other honeycomb paper material.

[0048] Next, a plurality of first straight cuts parallel to each other along a first cutting direction are made on the slab 8. Preferably, the cuts are made simultaneously.

[0049] A plurality of second cuts are then made on the slab 8. The second cuts are straight and parallel to each other along a second cutting direction which is perpendicular to the first cutting direction. The second cuts are made one at a time and in succession. The substantially rectangular plates are thus made. According to what is stated above in connection with the blank 1, the spacer elements 7 are applied by placing them on the portions, described above, of the panels 2, 3 forming the inside surface 41a, 42a of the walls 41, 42 of the box 40. More specifically, the spacer elements 7 are positioned on the panels 2, 3 in such a way that one side of them is parallel to the adjacent crease line 4.

[0050] Application of the spacer elements 7 entails fixing them to the panels 2, 3. Preferably, this operation is done by gluing. In an alternative embodiment, not illustrated, but falling within the scope of the invention, fixing is accomplished by stapling.

[0051] A further object of this invention is a machine for making the blank 1 starting from a sheet on which, preferably, the cutting and creasing operations have al-

ready been performed in substantially known manner. In the accompanying drawings, the machine is denoted in its entirety by the reference numeral 100.

[0052] The machine 100 comprises a cutting and creasing unit (not illustrated in the drawings) which cuts out the blanks 1 from cardboard sheets and then makes the above described crease lines 4 and cut lines 5 to form the panels 2, 3.

[0053] According to the invention and as illustrated in Figures 8 to 10, the machine 100 comprises a unit 11 for making the above mentioned spacer elements 7, a device 110 for picking up and moving the spacer elements 7, a station 120 for gluing the spacer elements 7, and a station 130 for applying the spacer elements 7 on the blanks 1.

[0054] The machine 100 comprises the aforesaid unit 11 for making the spacer elements 7, a preferred embodiment of the unit 11, being illustrated in Figures 4 to 7 and described in detail below.

[0055] As illustrated in Figures 8 to 11 and in the details of Figures 12 to 14, the unit 11 is operatively flanked by the above mentioned device 110 for picking up and moving the spacer elements 7.

[0056] The pickup and movement unit 110 comprises a portal frame 111 on which a sliding unit 113 is slidably movable along a direction 112.

[0057] The sliding unit 113 comprises a slide 114 and an arm 115 which is movable slidably relative to the slide 114 along a direction 116 substantially coinciding with its axis of longitudinal extension.

[0058] At a lower end of it 115a, the arm 115 comprises a crosspiece 117, shown more clearly in Figure 11, along which are distributed a plurality of pickup heads 118 for picking up individual spacer elements 7.

[0059] In the preferred embodiment illustrated, the pickup heads 118 have pin-like elements 119 adapted to penetrate the cardboard the spacer elements 7 are made of.

[0060] Alternatively, in variants not illustrated, the pickup heads 118 comprise suction means such as, for example, suction cups. This alternative is advantageous, for example, when the spacer elements 7 are made of a material whose consistency does not allow easy penetration by the pin-like elements 119.

[0061] The heads 118 are movable along the crosspiece 117. Advantageously, the heads 118 are movable along the crosspiece 117 by suitable actuator means which are not described in detail.

[0062] As mentioned, the machine 100 comprises a station 120 for gluing the spacer elements 7 and comprising a plurality of glue dispensing means 121.

[0063] As illustrated in Figure 13, each glue dispensing means 121 comprises at least one nozzle 122 through which the glue is delivered and spread on a spacer element 7 supported by a respective pickup head 118.

[0064] The machine 100 also comprises the above mentioned station 130 for applying the spacer elements 7, the station 130 having a supporting surface 131 for

supporting a blank 1 from the above mentioned cutting and creasing unit not illustrated. At the station 130, the spacer elements 7, with glue already on them, are placed on the blank 1 using the pickup heads 118 and according to the method described in more detail below. In use, the unit 11, as described in detail below, performs suitable transversal and longitudinal cutting steps to make the above mentioned spacer elements 7 from the cardboard slabs 8.

[0065] The spacer elements 7 are then advanced until they come into abutment against a stop element 125, shown in Figure 12, located on an extension 13c of a supporting surface 13 described below.

[0066] As illustrated in Figure 8, starting from this abutment position, the spacer elements 7 are picked up by respective pickup heads 118 and by suitable coordinated movements of the heads 118 along the crosspiece 117, of the crosspiece 117 itself, of the arm 115 and of the slider 114, are carried to the gluing station 120.

[0067] As illustrated in detail in Figures 9 and 13, at the station 120 each spacer element 7 receives on its underside 7a a certain quantity of glue dispensed through the nozzles 122 of the dispensers 121.

[0068] The spacer elements 7, with glue on them, are then advanced by further movements of the heads 118 along the crosspiece 117, of the crosspiece 117, of the arm 115 and of the slider 114 until they reach respective positions where they are applied to the blank 1 which has in the meantime been positioned at the application station 130.

[0069] For applying the spacer elements 7 on the blank 1 the heads 118 must move the elements 7 themselves close to the surface of the blank 1, apply enough pressure to let the glue set and then release and move away from the spacer elements 7, which are now attached to the blank 1.

[0070] The elements 7 are released by the heads 118 when the pin-like elements 119 are detached from them on account of the retaining action exerted by the glue (and by the blank 1 which the glue is now integral with) on the spacer elements 7.

[0071] In the alternative embodiment with the suction cup means, mentioned above and not illustrated, the heads 118 are detached from the spacer elements 7 by advantageously turning off the suction.

[0072] The movements described above of the heads 118 along the crosspiece 117, of the arm 115 relative to the slider 114, and of the slider 114 along the upper beam 111a of the frame 111, are controlled and coordinated by a computerized control unit and implemented by respective motor means of known type, such as, for example, electric motors or hydraulic or pneumatic actuators. Figures 15 to 17 show an alternative embodiment of the machine 100 just described above.

[0073] The machine 100 of Figures 15 to 17 has substantially the same parts as the one described above, except that the stations and devices are laid out differently relative to each other.

[0074] More specifically, as shown in Figures 15 to 17, the pickup heads 118 are movable along the direction 132, whilst the spacer elements 7 are positioned on the blank 1 in the direction 133 by the controlled movement of the blank itself as it advances in that direction, as indicated by the arrow F.

[0075] Whatever the specific embodiment of the machine 100 according to the invention, the pickup heads 118 might also comprise pneumatically or hydraulically operated grippers, constituting alternative pickup means instead of the pin-like elements 119 or the suction cups. The grippers, not illustrated, each comprise two jaws which close to laterally grip each spacer 7 and open to release it on reaching the required position relative to the blank 1 at the application station 130.

[0076] Lastly, according to further variants of the invention, not illustrated, the machine 100 comprises one or more robotized arms for supporting and moving the pickup heads 118 for picking the spacer elements 7.

[0077] With reference in particular to Figures 4 to 7, which illustrate a preferred embodiment of it, the unit 11 comprises a mounting structure 12 comprising at least one supporting surface 13 on which to place a plurality of the above mentioned cardboard slabs 8 stacked on top of each other. At a first end 13a of the supporting surface 13 there is a movement means 14 for moving the slabs 8 along a movement direction "D" for subsequent processing.

[0078] More in detail, the movement means 14 comprises a plurality of power-driven rollers 15 aligned along respective axes of rotation perpendicular to the direction of movement "D" (Figure 5).

[0079] The movement means 14 also comprises a corresponding plurality of idle rollers 16, each associated with a respective power-driven roller 15.

[0080] In the embodiment illustrated in Figures 4 and 5, the movement means 14 comprises three power-driven rollers 15 associated with three idle rollers 16.

[0081] More in detail, the idle rollers 16 are located at a height above the power-driven rollers 15 and are mounted on a single mounting element 17 slidably associated with the mounting structure 12 of the machine 100. Elastic means 33 are operatively located between the mounting structure 12 and the mounting element 17 of the idle rollers 16 in such a way as to push the idle rollers 16 towards the power-driven rollers 15. That way, the movement means 14 always has a firm hold on each slab 8 it moves. For example, the elastic means 33 comprise two springs 33a located on opposite sides of the mounting element 17.

[0082] A first cutting device 18 is operatively located downstream of the movement means 14 so that the latter can feed the cardboard slabs 8 to the first cutting device 18 itself.

[0083] The cutting device 18 makes at least one cut along a first cutting direction "T1". The first cutting device 18 comprises a plurality of distinct cutting heads 19 which make respective first cuts parallel to each other along

the first cutting direction "T1". It should be noted that the first cutting direction "T1" coincides with the movement direction "D".

[0084] More in detail, in the embodiment described, the first cutting device 18 comprises three cutting heads 19 which make three parallel cuts in each slab 8 (Figure 6).

[0085] Each cutting head 19 comprises a disc-shaped rotary blade 20 and a counter-blade disc 21 associated with the blade 20. More specifically, the counter-blade disc 21 has a peripheral groove occupied by the blade 20 during the cutting operation.

[0086] The cutting device 18 is rigidly associated with the mounting structure 12. Looking in more detail, each cutting head 19 is fixedly associated with the mounting structure 12 with reference in particular to movement in a vertical direction.

[0087] The machine 100 also comprises a second cutting device 22 which makes at least one second cut in the slab 8 along a second cutting direction "T2" perpendicular to the first cutting direction "T1".

[0088] The second cutting device 22 comprises a single cutting head 23 movable along the second cutting direction "T2" (Figure 7). More specifically, the cutting head 23 of the second cutting device 22 comprises a carriage 24 that runs along a guide 25 and mounts a rotary blade 26. The blade 26 of the cutting head 23 of the second cutting device 22 slides and rotates along a guide bar 27 which acts as a counter-blade.

[0089] The cutting head 23 of the second cutting device 22 is driven by a motor 28 fixed to the mounting structure 12 and by a belt 29.

[0090] The machine 100 also comprises a pusher means 30 located at the supporting surface 13 to come into contact with the cardboard slabs 8 and push them towards the movement means 14. For example, the supporting surface 13 comprises two portions (not illustrated) which are parallel to, and at a certain distance from, each other. The pusher means 30 is located between the afore-said portions of the supporting surface 13 at a second end 13b of the supporting surface 13 itself. More specifically, the pusher means 30 is mounted in such a way as to project at least partly from the supporting surface 13 so as to be able to come into contact with the slabs 8 in order to push them.

[0091] In the embodiment illustrated, the pusher means 30 comprises a pushing arm 31 located between the portions of the supporting surface 13 and protruding from the latter. The pushing arm 31 is movable towards the movement means 14 in such a way as to strike one edge of the slab 8 to push the latter towards the movement means 14. The pusher means 30 also comprises a linear actuator 32, preferably hydraulic or pneumatic, connected to the pushing arm 31 in order to actuate it.

[0092] More in detail, it should be noted that the supporting surface 13 has a plurality of stacked slabs 8. The pushing arm 31 strikes the lowermost slab 8 in the stack and pushes only that one towards the movement means

14 so that the other slabs 8 remain on the supporting surface 13.

[0093] It should be noted that the unit 11 for making the spacer elements 7 might also exist and operate completely independently of the cutting and creasing unit.

[0094] The invention achieves the set aims.

[0095] In effect, the provision of the spacer elements on the blank according to the invention makes it possible to obtain a box inside of which the object to be packaged can be held in place against the spacer elements. That way, the object packaged snugly occupies the space inside the box without the risk of moving and being damaged and without necessitating additional protective elements made of polystyrene.

[0096] Moreover, the boxes obtained from the blank described herein make it possible to simplify waste disposal and recycling procedures because all the parts of the packaging are made of cardboard and the entire box can be disposed of in a single procedure.

Claims

1. A blank for making a cardboard box comprising a plurality of panels (2, 3), each at least partly forming a wall of the box (40), the panels (2, 3) being separated in pairs by respective crease lines (4) or cut lines (5); **characterized in that** it comprises a plurality of spacer elements (7) located at least in corners of the panels (2, 3) close to respective crease lines (4).
2. The blank according to claim 1, **characterized in that** the spacer elements (7) are located on portions of the panels (2, 3) forming an inside surface (41a, 42a) of the walls (41, 42) of the box (40).
3. The blank according to claim 1 or 2, **characterized in that** the spacer elements (7) are plates, substantially rectangular in shape, and are positioned with at least one side parallel to the crease line (4).
4. A machine for making a blank (1) according to any of the preceding claims, comprising:
 - a unit (11) for making the spacer elements (7) from a sheet (8) of slab material;
 - a device (110) for picking up and moving the spacer elements (7) made by the unit (11);
 - a station (130) for applying the spacer elements (7) where the pickup and movement device (110) applies the spacer elements (7) to a respective blank (1).
5. The machine according to claim 4, **characterized in that** it comprises a station (120) for gluing the spacer elements (7) where a predetermined quantity of glue is spread on at least one face of the spacer

elements (7).

6. The machine according to claim 4 or 5, **characterized in that** the device (110) for picking up and moving the spacer elements (7) comprises a plurality of pickup heads (118) for picking up the spacer elements (7). 5
7. The machine according to any of the claims from 4 to 6, **characterized in that** the unit (11) for making the spacer elements (7) comprises: 10
 - a mounting structure (12) forming a supporting surface (13) for at least one slab of cardboard;
 - a first cutting device (18) for making at least one first cut on the slab along a first cutting direction (T1); 15
 - a movement means (14) for moving the slab on the supporting surface (13) towards the first cutting device (18); 20
 - a second cutting device (22) operatively located downstream of the first cutting device (18) for making at least one second cut on the slab along a second cutting direction (T2) perpendicular to the first cutting direction (T1). 25
8. The machine according to claim 7, **characterized in that** the first cutting device (18) comprises a plurality of cutting heads (19), each occupying a fixed position relative to the mounting structure (12). 30
9. The machine according to claim 7 or 8, **characterized in that** it comprises a pusher means (30) located in the vicinity of the supporting surface (13) for pushing the cardboard slab towards the movement means (14). 35
10. A method for making a blank for making a cardboard box, **characterized in that** it comprises the steps of: 40
 - preparing at least one sheet of cardboard;
 - making a plurality of crease lines (4) and/or cut lines (5) on said cardboard sheet in order to form a plurality of panels (2, 3) separated in pairs by said crease lines (4) or cut lines (5); 45
 - making a plurality of spacer elements (7);
 - applying the spacer elements (7) in corners of the panels (2, 3) close to respective crease lines (4). 50
11. The method according to claim 10, **characterized in that** the step of making the spacer elements (7) comprises the steps of preparing a slab of cardboard and making a plurality of first cuts along a first direction and a second plurality of cuts along a second direction substantially at a right angle to the first direction, so as to obtain substantially rectangular plate-shaped spacer elements (7). 55

12. The method according to claim 10 or 11, **characterized in that** the step of applying the spacer elements (7) is performed by positioning said spacer elements (7) on portions of the panels (2, 3) forming an inside surface (41a, 42a) of the walls (41, 42) of the box (40).

13. The method according to claim 11 or 12, **characterized in that** the step of applying said spacer elements (7) comprises the step of aligning one side of them parallel to a crease line (4).

14. The method according to any of the claims from 10 to 13, **characterized in that** the step of applying said spacer elements (7) is accomplished by gluing them to the panels (2, 3).

FIG 1

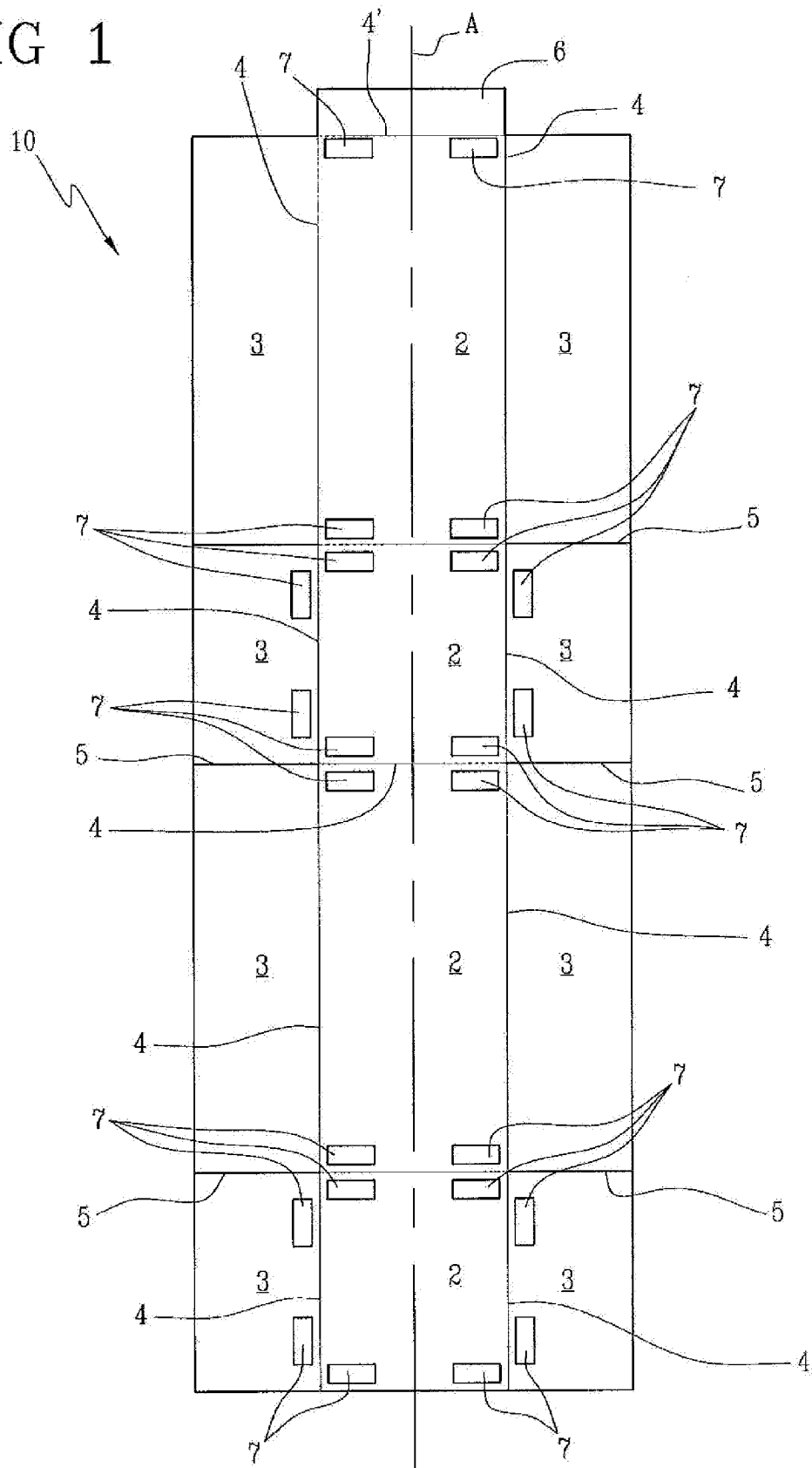


FIG 2

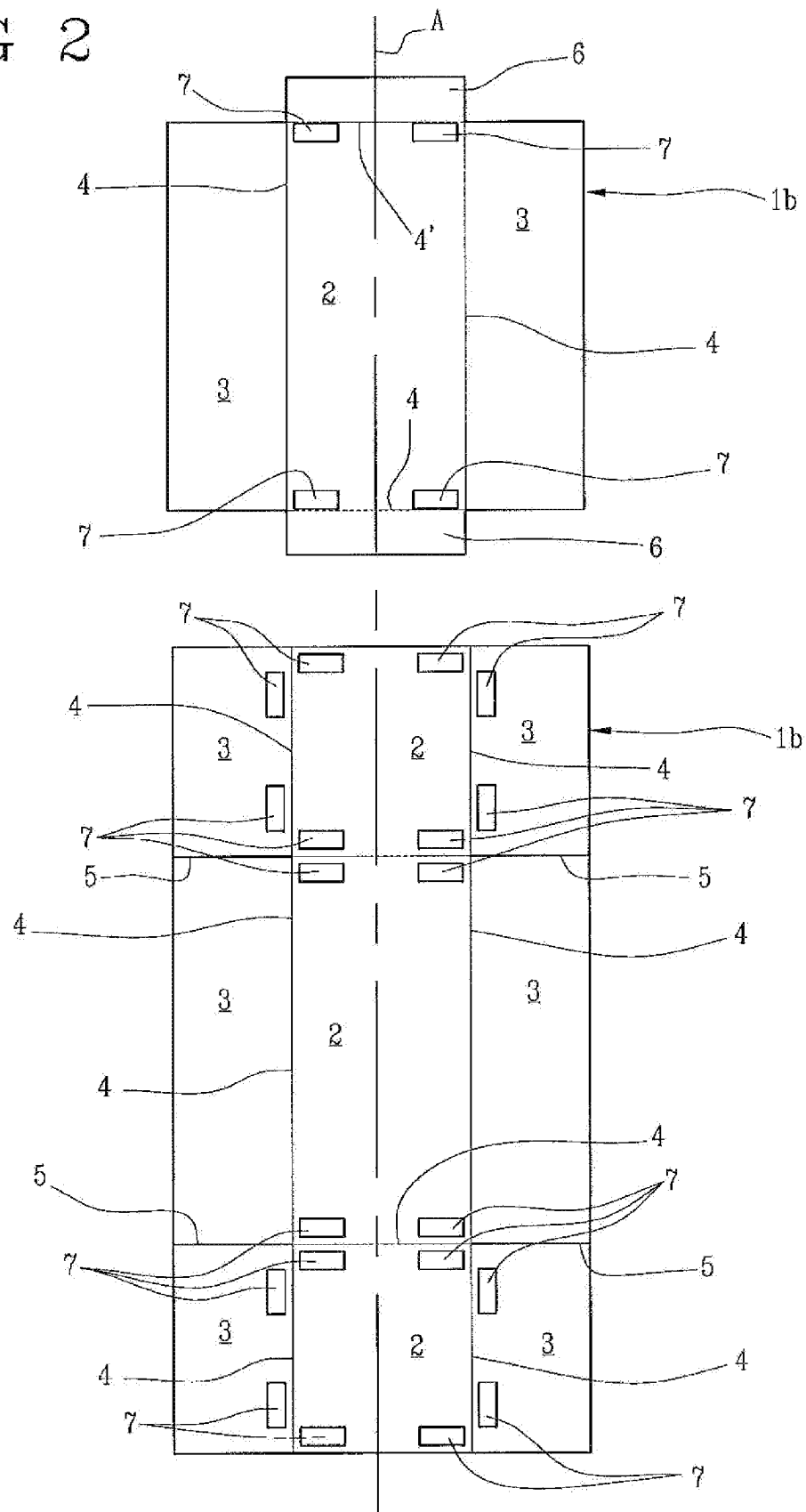
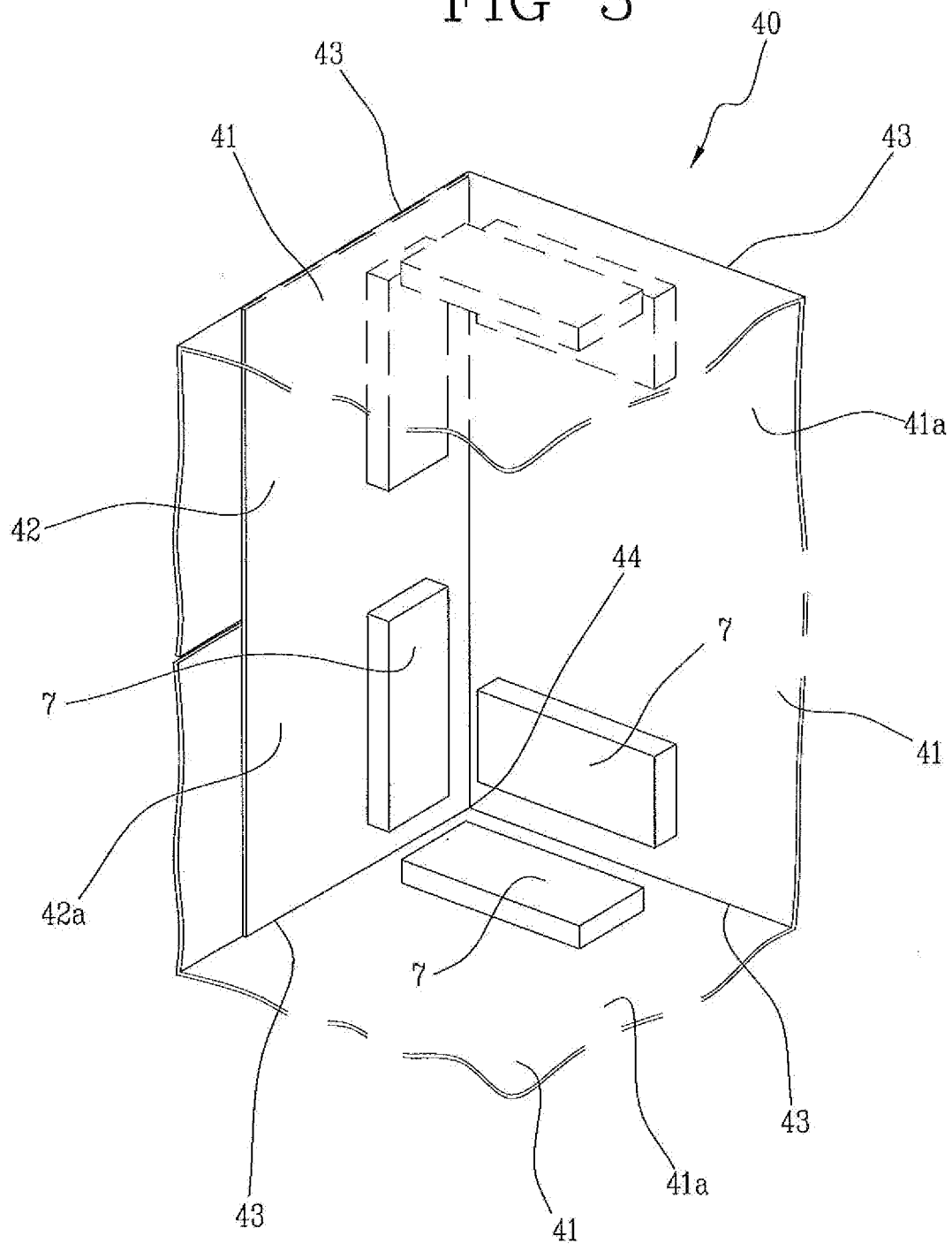


FIG 3



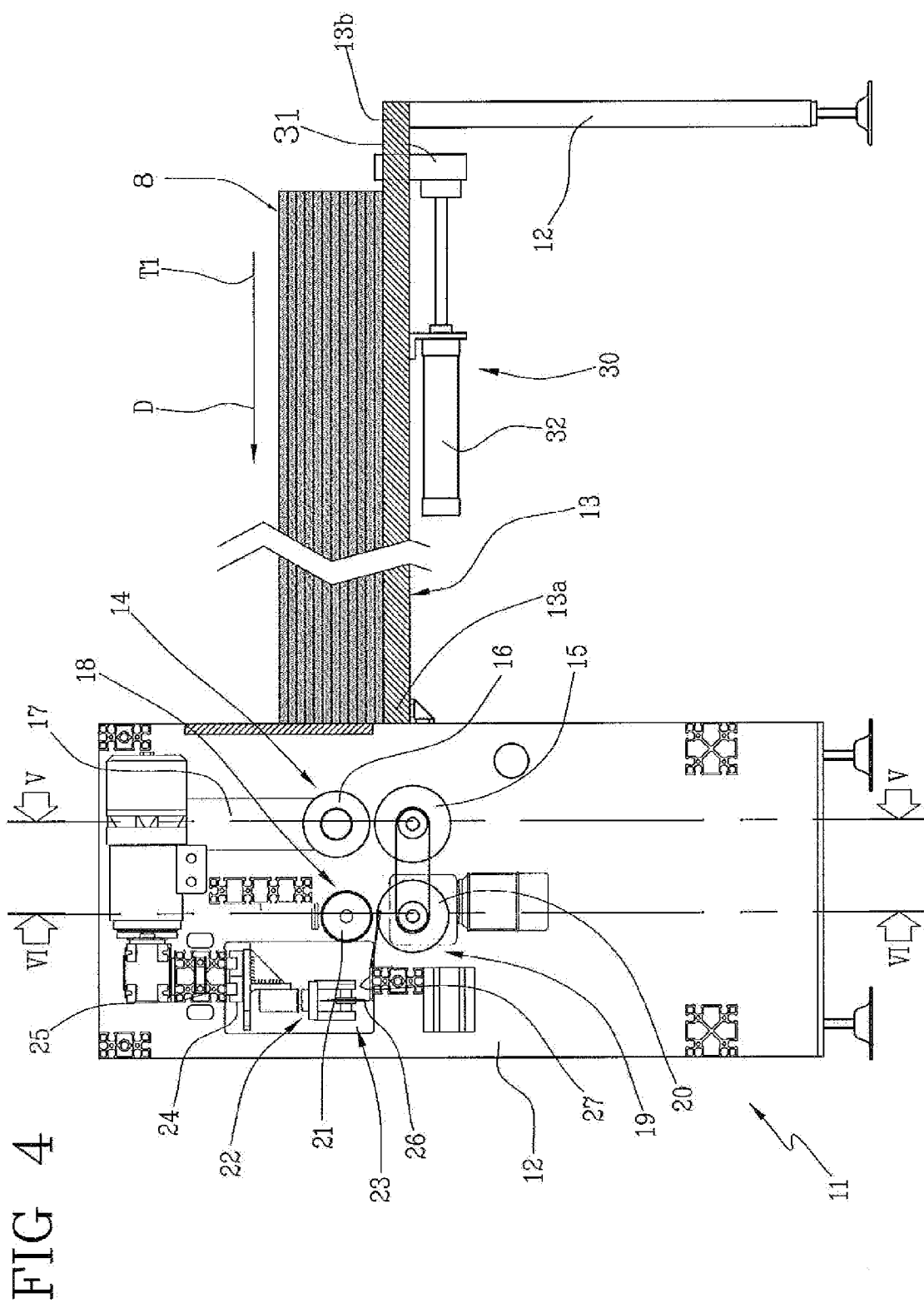


FIG 5

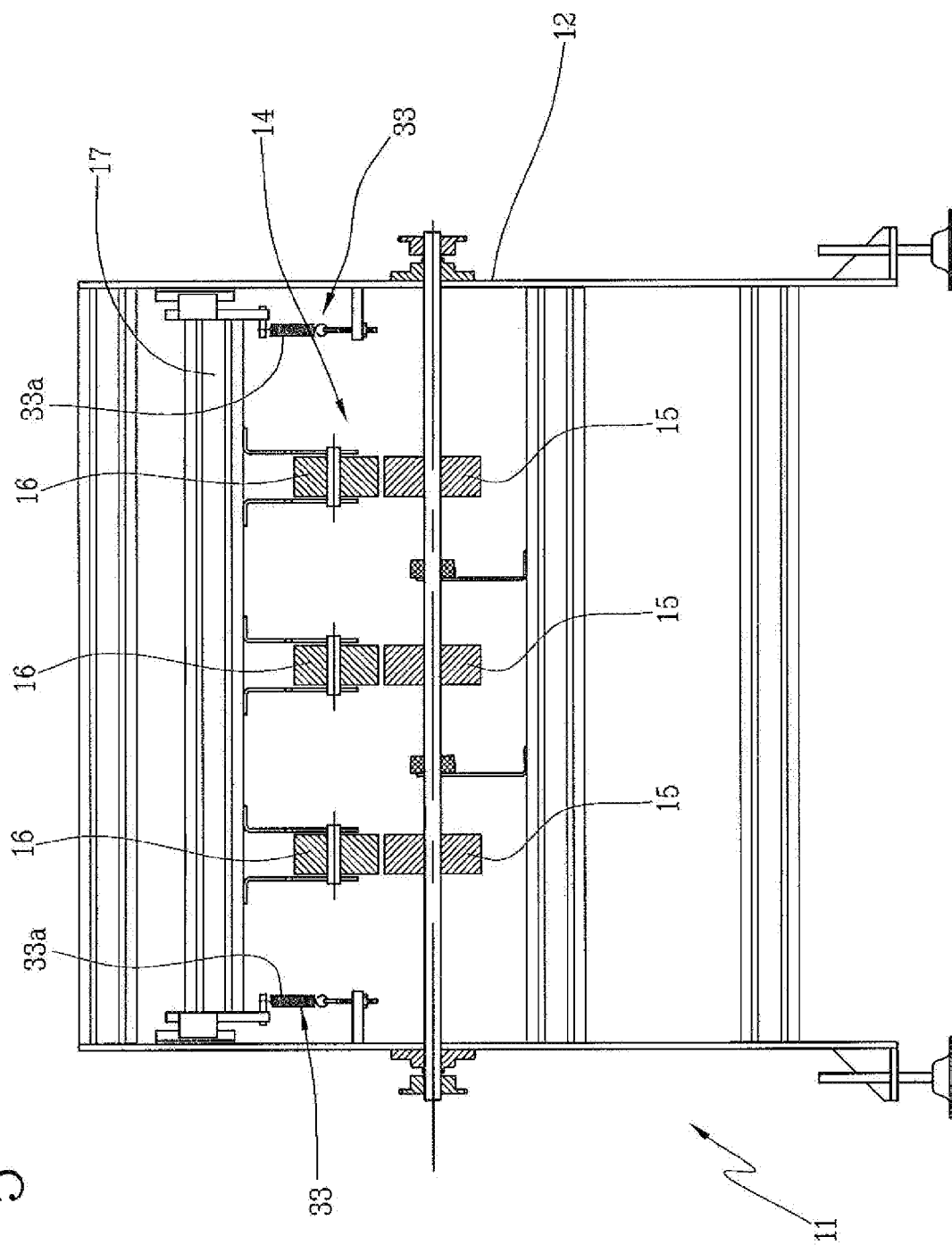
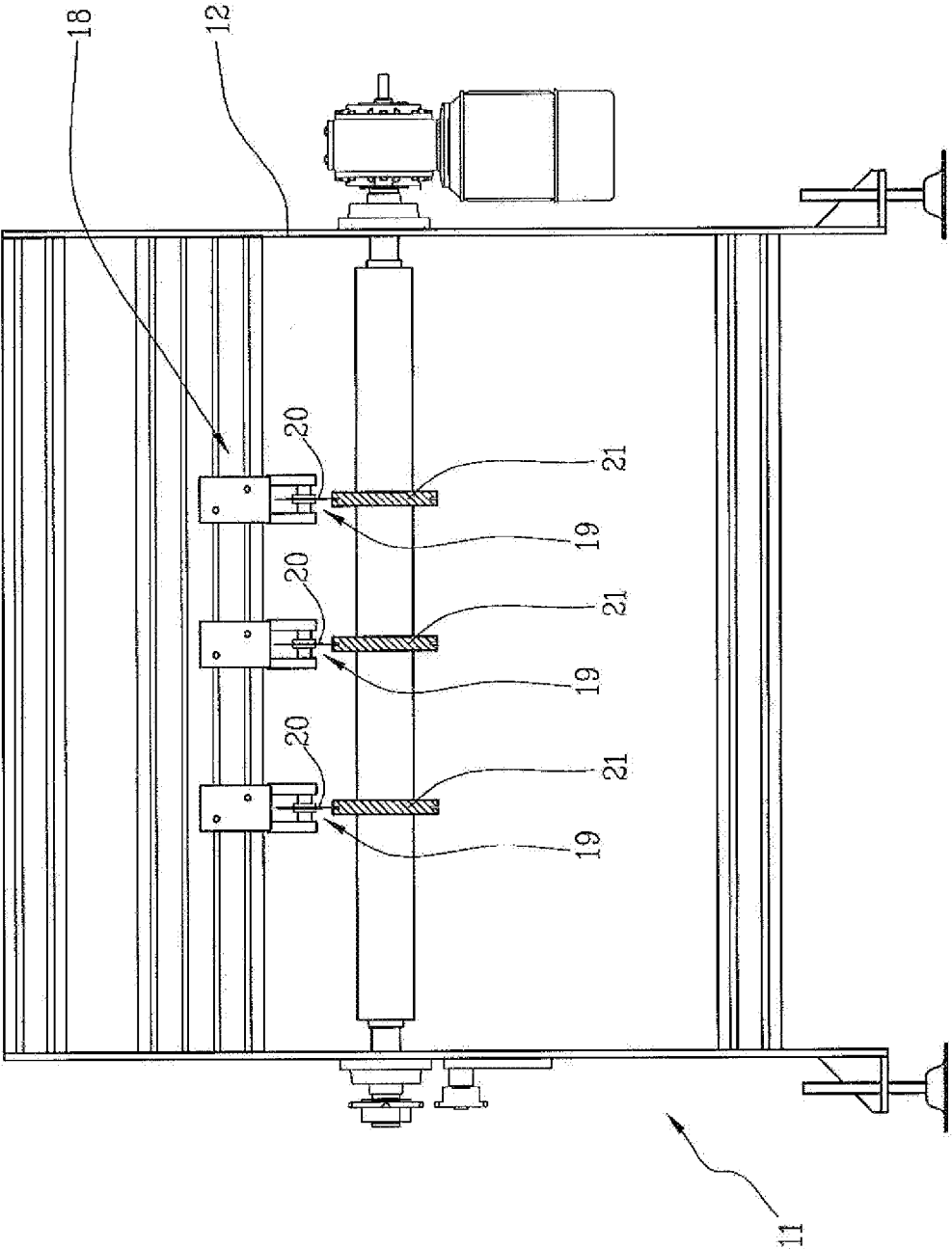
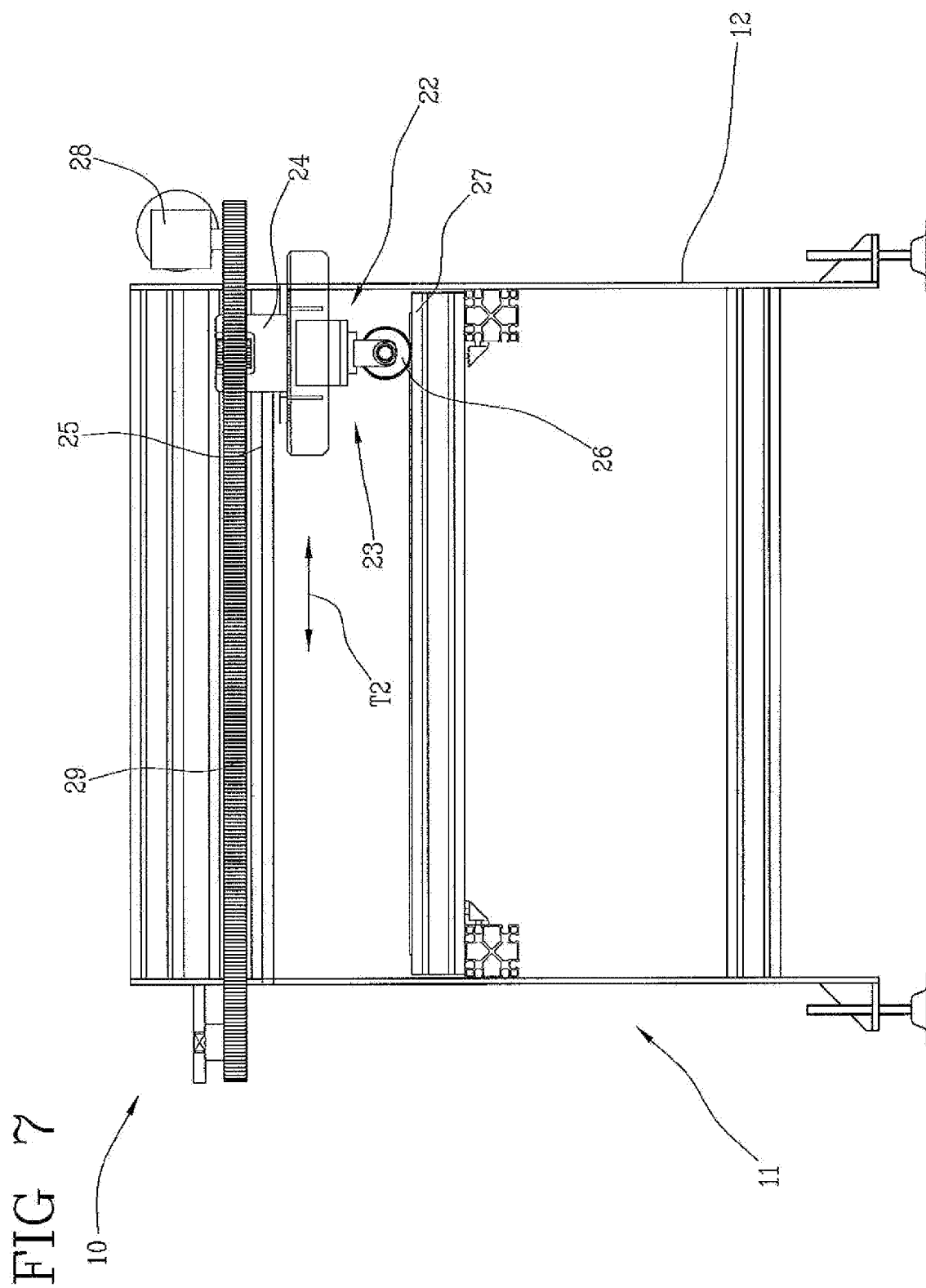
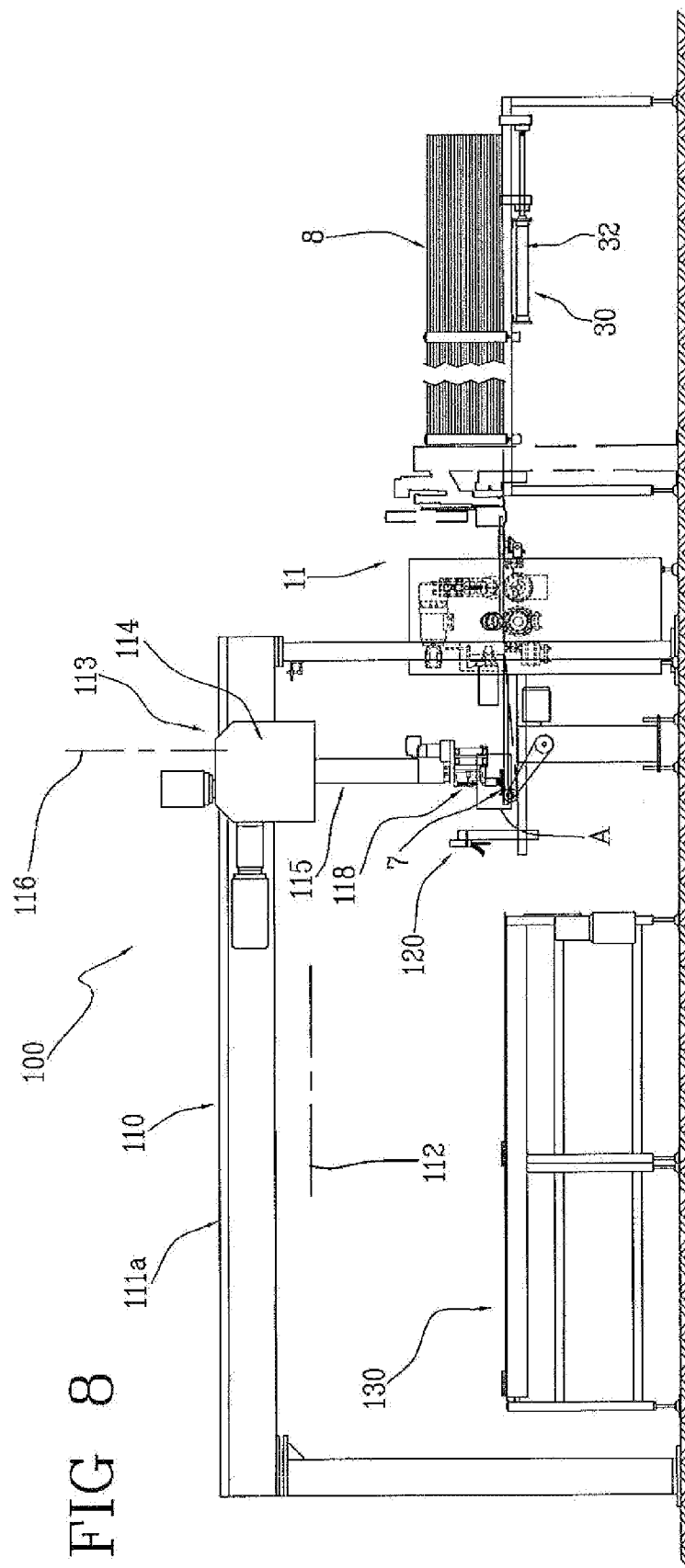


FIG 6







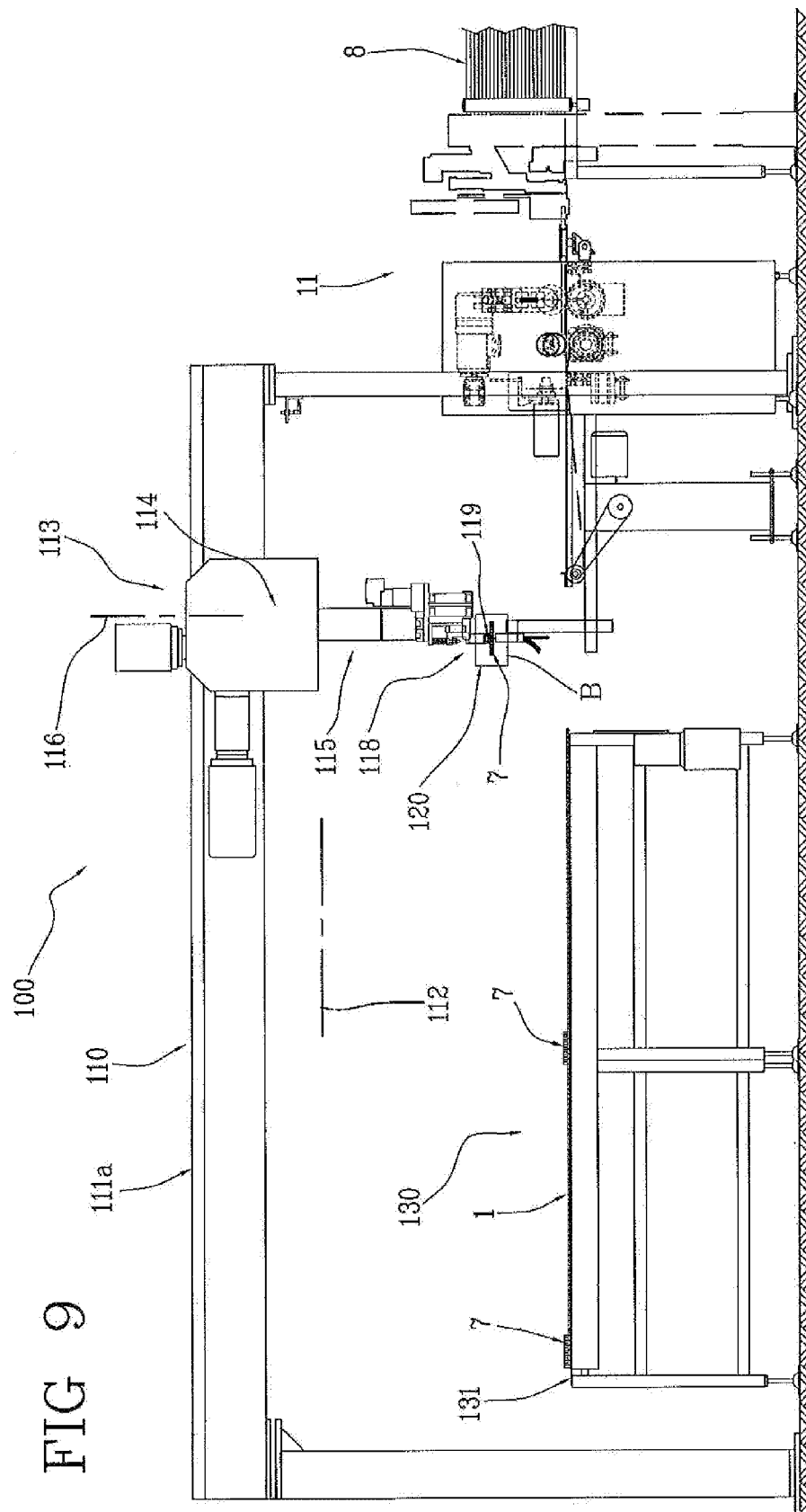
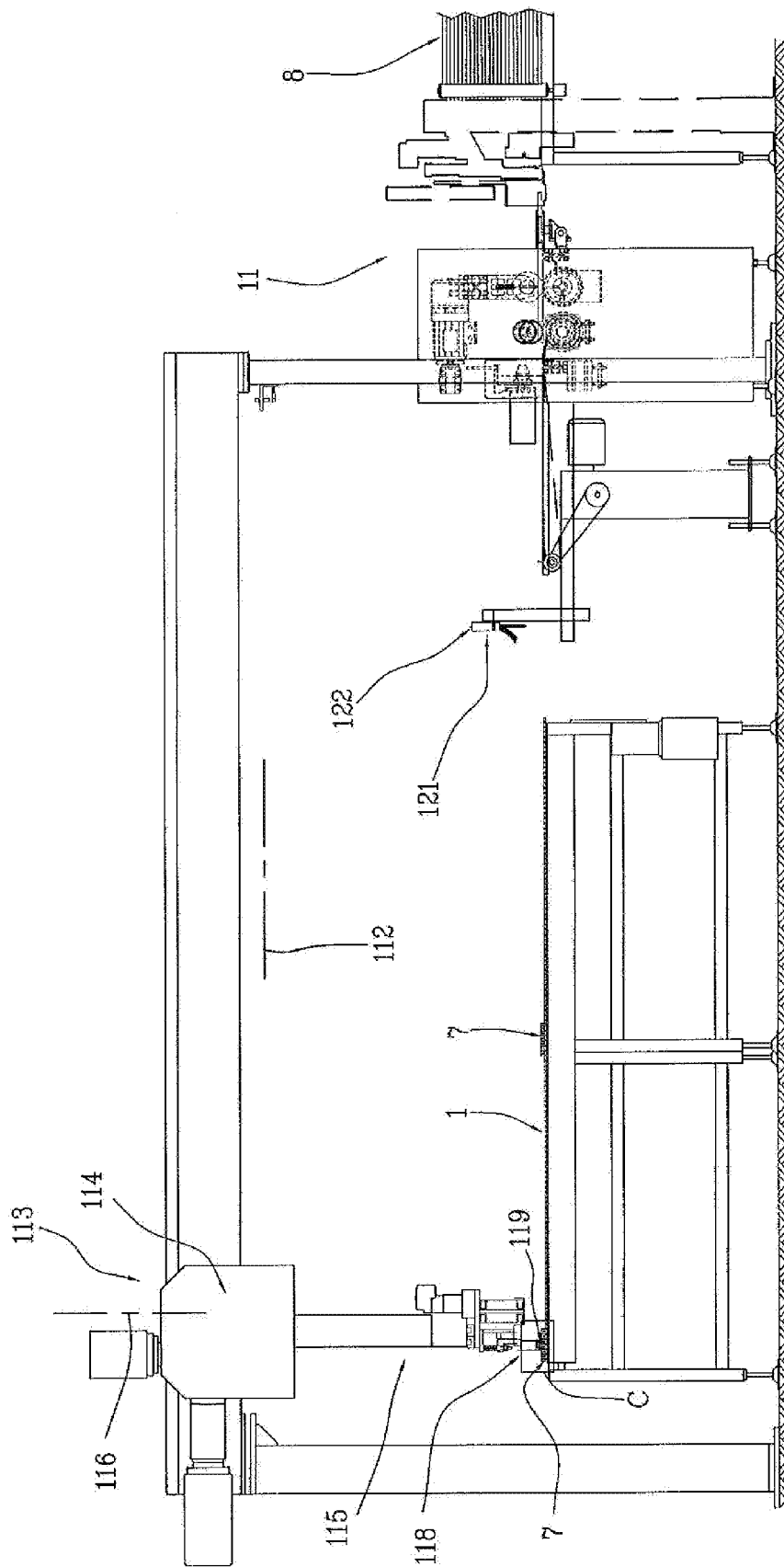


FIG 10



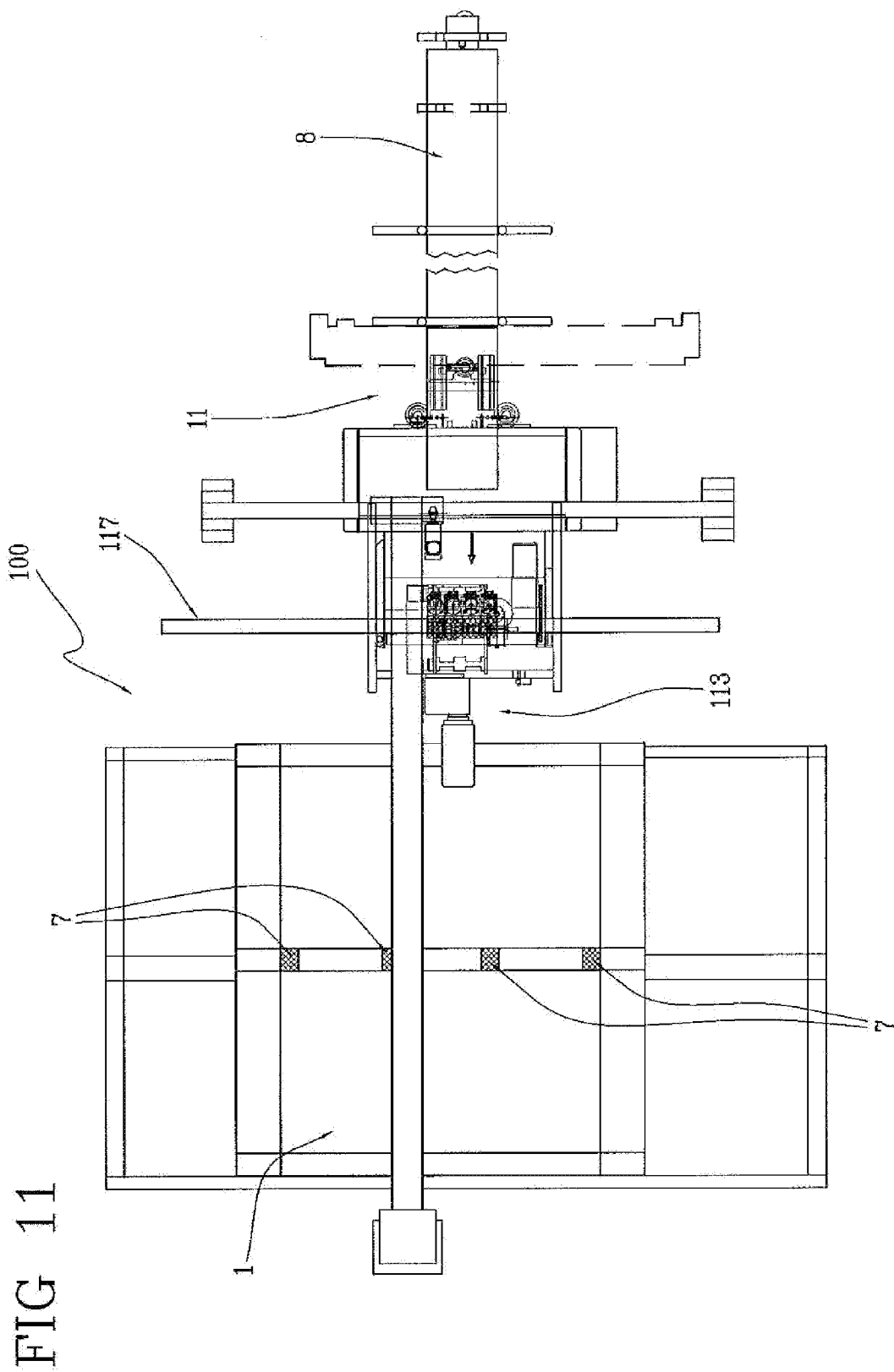


FIG 12

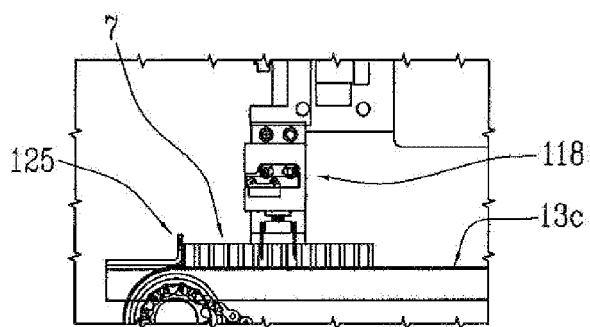


FIG 13

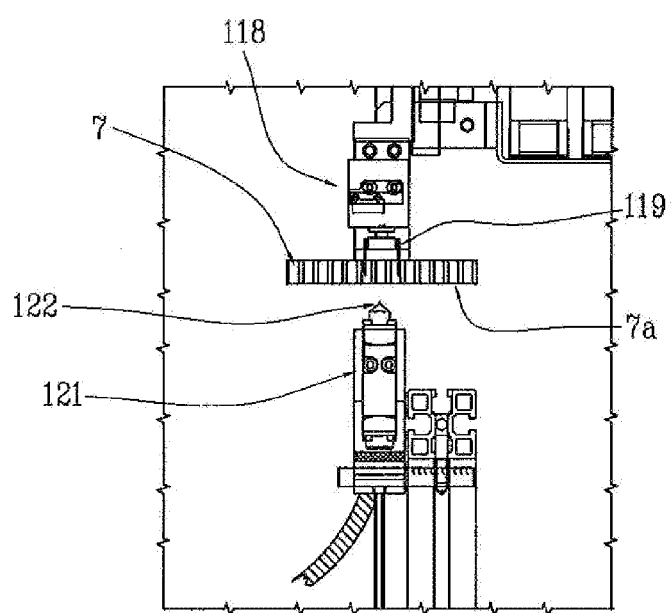


FIG 14

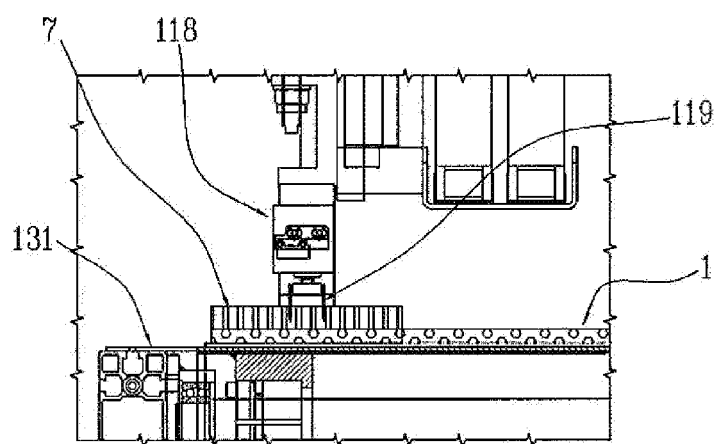


FIG 15

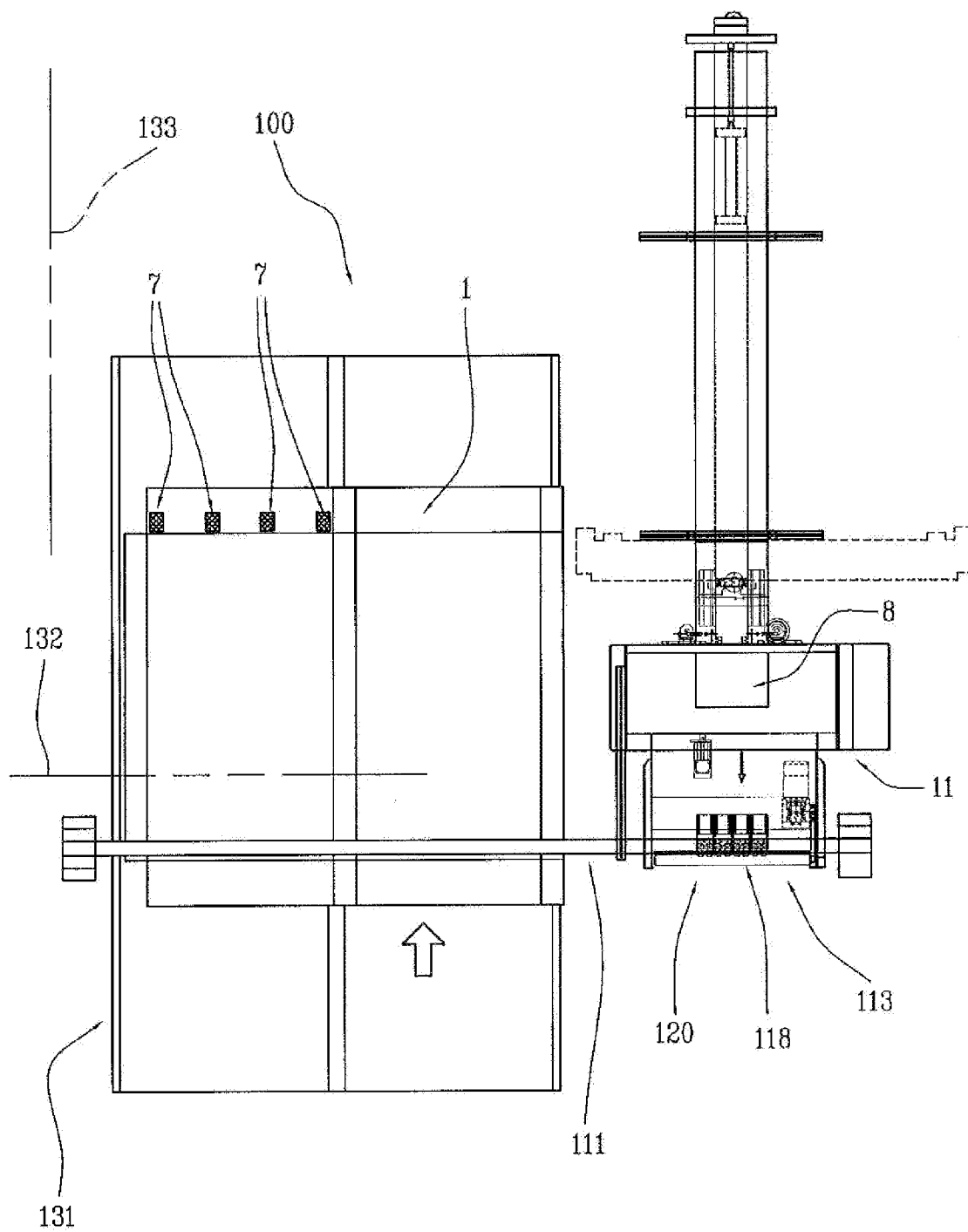


FIG 16

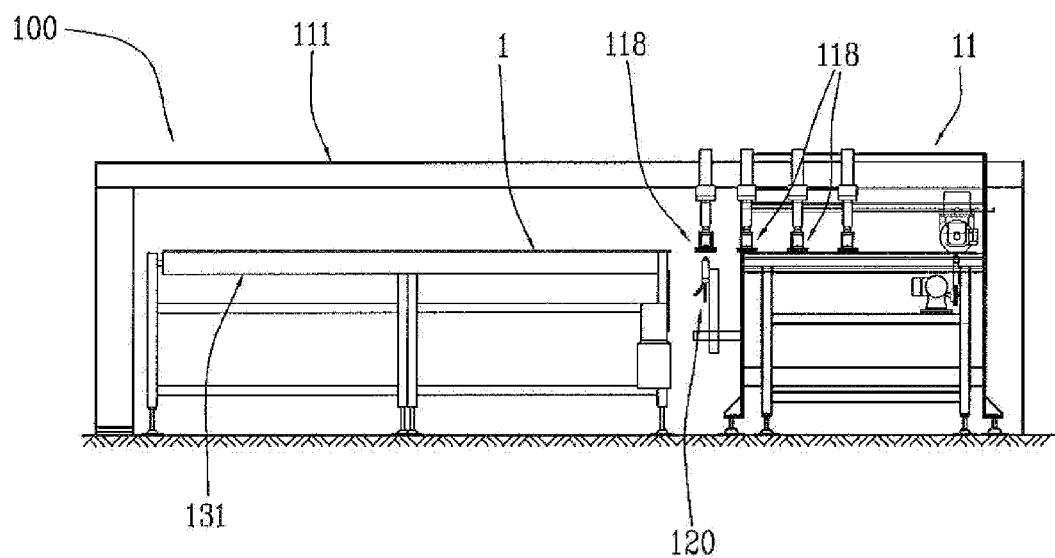
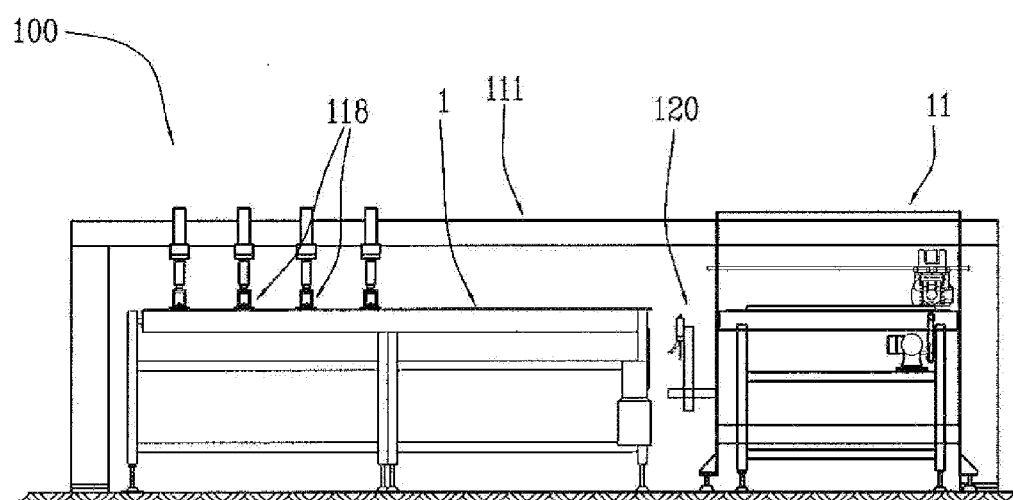


FIG 17





EUROPEAN SEARCH REPORT

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