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(54) EQUIPMENT FOR MAKING EDGED TRAYS OF DIFFERENT DIMENSIONS OR TYPES

(57) An equipment (100) for making edged trays (200) starting from punched sheets (210), comprising a feeding zone (1) to hold a plurality of said punched sheets (210), a forming device (20) configured to form the tray (200), and at least one handling element (15) to transfer at least one of said punched sheets (210) from said feeding zone (1) to said forming device (20), characterized in that said feeding zone (1) comprises a plurality of

magazines (10), each configured to hold punched sheets (210) of different dimensions or types, preferably arranged on top of each other to form a stack (250), and said forming device (20) comprises adjusting means (5, 6, 7) driven by a control unit (U) to adapt the dimensions of said forming device (20) to the different sizes of a punched sheet (210) and of the corresponding tray (200) to be formed.

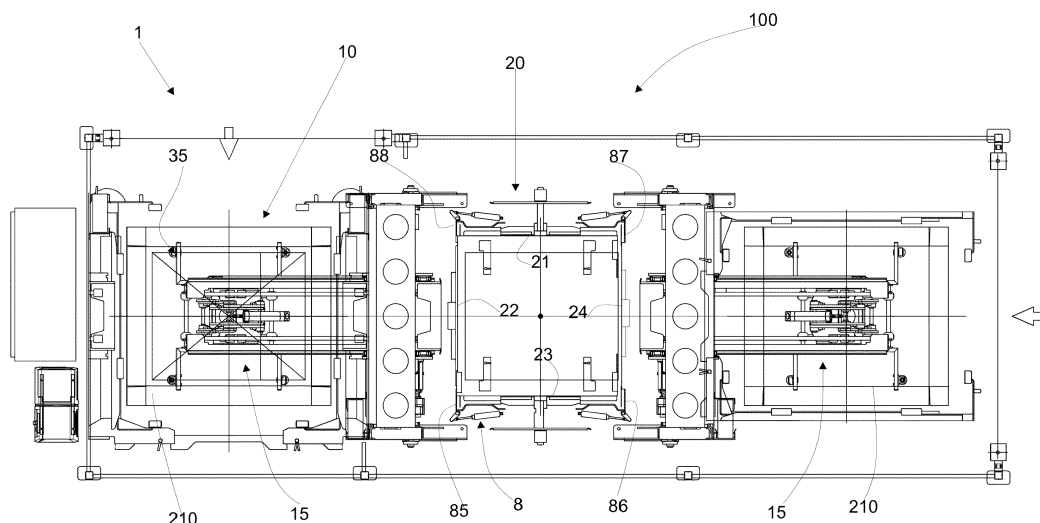


Fig.1a

Description

FIELD OF APPLICATION OF THE INVENTION

[0001] The present invention relates to an equipment for making edged trays starting from punched sheets, preferably in cardboard.

STATE OF THE ART

[0002] Equipment for making edged trays are known in the prior art.

[0003] Said edged trays are adapted, for example, to hold bottles or other containers.

[0004] They are made starting from punched elements, preferably in cardboard, which provide for creasing lines onto which the folding of flaps and fins is to be performed, defined by the above-mentioned creasing lines, thus making the tray.

[0005] Said equipment for making edged trays comprise a magazine for the punched sheets, arranged in a stack, a handling element for at least one sheet to be processed, and a plurality of forming walls into which the sheet is forcibly inserted, so as to obtain, by virtue of the folding of flaps and fins of the same sheet, the above-mentioned edged tray.

[0006] Said punched sheets are generally stacked in a magazine, preferably in a vertical or horizontal extension.

[0007] The forming equipment generally provide for an adequate handling element, which transfers the punched sheet to the forming zone, where the punched sheet is arranged at a die comprising a plurality of forming walls, so shaped as to create in the punched sheet the folds, defined by the pre-existing creasing lines, required for making the edged tray.

[0008] Once the punched sheet is placed in the die, a special punch forces the punched sheet into the space defined by the forming walls, causing the folding of the flaps and fins defined by the above-mentioned creasing lines. and at least partially making the tray.

[0009] This operation can be referred to as deep drawing.

[0010] The forming of the edged tray generally is completed with the aid of any auxiliary forming means, which provide, for example, the closure of the same tray with glue or staples or by interlocking, or in any case, ensure its finishing in accordance with the provisions defined during the design phase.

[0011] Generally, a second handling element picks up the tray format and brings it at a storage station, from where such tray can be retrieved for future use.

[0012] Generally, the known equipment comprise a single magazine of stacked punched sheets, in a vertical extension, arranged for example laterally to the forming zone of the punched sheets.

[0013] Therefore, said equipment can be fed with a single type of punched sheet at a time.

[0014] Consequently, also the forming zone is so

shaped as to be able to process a single type of punched sheet at a time; therefore, also the forming walls of the die are possibly adjustable, partially manually.

[0015] In the prior art, in order to process different punched sheets, necessary to perform a so-called format change, which generally consists of emptying the magazine of the previous format of punched sheet and inserting a new stack of punched sheets.

[0016] Accordingly, all parts of the forming zone that are closely related to the configuration and dimensions of the punched sheet and the tray to be formed must be adjusted. For example, the forming walls and the auxiliary forming means must be adjusted.

[0017] Therefore, said known equipment is not flexible enough to simultaneously produce trays of different shape and dimension, which involves a labour-intensive format change with long execution times, making said machines not very flexible.

DISCLOSURE AND ADVANTAGES OF THE INVENTION

[0018] The technical problem underlying the present invention is to provide an equipment for making edged trays starting from punched sheets, structurally and functionally designed to overcome one or more of the limitations set forth above with reference to the cited prior art.

[0019] In the context of the above-mentioned problem, a main object of the invention is to develop an equipment for making edged trays starting from punched sheets that allows for the processing of punched sheets having different shapes and sizes to obtain respective different trays

[0020] It is also an object of the present invention to allow the processing of different punched sheets without the need to perform format change operations.

[0021] A further object of the invention is also to provide an equipment for making edged trays starting from punched sheets within the scope of a simple, rational, and extremely flexible solution.

[0022] Such and other objects are achieved by virtue of the characteristics of the invention outlined in the independent claim 1. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

[0023] In particular, an implementation of the present invention provides an equipment for making edged trays starting from punched sheets, comprising a feeding zone to hold a plurality of said punched sheets, a forming device configured to form the tray. Preferably, the equipment comprises at least one handling element to transfer at least one of said punched sheets from said feeding zone to said forming device.

[0024] Said feeding zone preferably comprises a plurality of magazines, each configured to hold punched sheets of different dimensions or types.

[0025] Said punched sheets are preferably arranged on top of each other to form a stack.

[0026] Said forming device preferably comprises adjusting means driven by a control unit to adapt the dimensions of said forming device to the different sizes of a punched sheet and of the corresponding tray to be formed.

[0027] The forming device preferably comprises at least one forming die and at least one corresponding punch configured to form the tray by fitting into/disengaging from each other.

[0028] The die and the punch preferably fit into/disengage from each other by a reciprocating rectilinear motion along a preferably vertical straight line.

[0029] The forming device preferably comprises auxiliary means to fold and/or fix flaps and/or fins of said punched sheet being processed. Said adjusting means preferably comprise a first adjusting device, to adapt the dimensions of the die.

[0030] Said adjusting means preferably comprise a second adjusting device, to adapt the dimensions of the punch. Said adjusting means preferably comprise a third adjusting device to adapt the position of the auxiliary means.

[0031] The first adjusting device, and/or the second adjusting device, and/or the third adjusting device are preferably driven by the control unit to respectively adapt the dimensions of the die, and/or the dimensions of the punch, and/or to adapt the position of the auxiliary means during the operational cycle of the equipment.

[0032] A handling element preferably comprises activating means to rotate and/or translate at the magazines and the forming device.

[0033] The die preferably comprises forming walls configured to translate away from/closer to each other.

[0034] The forming walls are preferably mechanically associated with the first adjusting device.

[0035] Said first adjusting device is preferably driven by the control unit also during the operational cycle of the equipment to position the forming walls at a corresponding size as a function of the dimensions of the tray base.

[0036] The punch preferably comprises forming members configured to translate away from/closer to each other.

[0037] Said forming members are preferably mechanically associated with the second adjusting device.

[0038] Said second adjusting device is preferably driven by the control unit also during the operational cycle of the equipment to position said forming members at a corresponding size as a function of the dimensions of the tray base.

[0039] The auxiliary means preferably comprise folding members to fold the fins on the flap before the fixing thereof.

[0040] The auxiliary means preferably comprise locking members to fix said flaps to the fins.

[0041] The securing preferably occurs by means of interlocking and/or adhesive bonding and/or staple locking.

[0042] Said locking members are preferably config-

ured to translate away from/closer to each other.

[0043] Said locking members are preferably mechanically associated with the third adjusting device.

[0044] The third adjusting device is preferably driven by the control unit, also during the operational cycle of the equipment to position them at a corresponding size as a function of the type and the dimensions of the tray to be formed.

[0045] The locking means are preferably installed on the die.

[0046] Said punch preferably comprises fluidic suctioning means, preferably suction cups, for retaining said at least one punched sheet.

[0047] The die is preferably in a stationary position and the punch is movable with a reciprocating rectilinear motion.

[0048] The punch is preferably adapted to act as a pusher for the forced insertion of said sheet into said forming walls.

[0049] The punch is preferably installed on the handling element.

[0050] The forming device preferably comprises a centering device to center the punched sheet.

[0051] The centering device preferably comprises holding members that are opposite each other in pairs.

[0052] Preferably, said holding members, by a relative displacement, contact the sides of said punched sheet.

[0053] Said holding members are preferably driven by the control unit during the operational cycle of the equipment to position them at a corresponding size as a function of the dimensions of the tray base. In particular, an implementation of the present invention provides a method for making edged trays starting from punched sheets. Said method provides for picking up a punched sheet from a feeding zone and bringing it at a forming device to form the tray.

[0054] Said method preferably provides for forming trays of different dimensions or types by picking up punched sheets of different dimensions or types from a plurality of magazines.

[0055] Said method preferably provides for adapting the forming device to the different sizes and configurations of the punched sheet and of the corresponding tray to be formed.

[0056] Said method preferably provides for adapting the forming device during the operational cycle, to the different sizes of a punched sheet and of the corresponding tray to be formed.

[0057] Said objects and advantages are all achieved by the equipment for making edged trays starting from punched sheets, which is the subject matter of the present invention, which is characterized by what is provided for in the claims set forth herein below.

BRIEF DESCRIPTION OF THE FIGURES

[0058] This and other characteristics will be more clearly highlighted by the following description of some

embodiments, illustrated by way of non-limiting example in the accompanying drawings tables.

- Fig. 1a, 1b- depicts a plan view of two possible configurations of an equipment with two feeding magazines;
- Fig. 2a, 2b- depicts a front and side elevation view of an equipment according to the invention, with adjusting means highlighted;
- Fig. 3a, 3b- depicts a plan view of two possible configurations of an equipment with a plurality of feeding magazines.
- Fig. 4- depicts a detailed plan view of a detail of the die;
- Fig. 5a, 5b- depicts a plan view of a punched sheet and an axonometric view of a tray.

DESCRIPTION OF THE INVENTION

[0059] Referring in particular to Figs. 1, 2, and 3, an equipment 100 for making edged trays 200 starting from punched sheets 210 is depicted.

[0060] Said punched sheets 210 are preferably made in cardboard.

[0061] In particular, creasing lines 211 are provided for on the punched sheet 210, onto which the folding of flaps 203 and fins 202 defined by the above-mentioned creasing lines 211 is carried out in order to make the tray 200.

[0062] Said equipment 100 comprises a feeding zone 1 to hold a plurality of said punched sheets 210, preferably arranged in a stack 250.

[0063] Said equipment 100 further comprises a forming device 20.

[0064] Said forming device 20 preferably comprises a forming die 2 and a corresponding punch 3 configured to form the tray 200 preferably by fitting into/disengaging from each other.

[0065] This operation allows the deep drawing of the tray 200, i.e., it causes the folding of the flaps 203 and fins 202 defined by said creasing lines 211.

[0066] The die 2 and the punch 3 preferably fit into/disengage from each other by a reciprocating rectilinear motion along a preferably vertical straight line.

[0067] In particular, said movement of the die 2 and/or the punch 3 provides for a fixed stroke as a function of the height of the flaps 203.

[0068] Advantageously, said movement of the die 2 and/or the punch 3 provides for a variable stroke as a function of the different type of tray 200 to be made, in particular as a function of the different height of the flaps 203.

[0069] According to a preferred aspect, said stroke occurs in a controlled manner by a control unit U of the equipment 100.

[0070] Said control unit U serves to manage also the other automatic operations provided for on the equipment 100.

[0071] In particular, said control unit U is configured to

manage the making of the tray 200 according to different recipes as a function of the different types and dimensions of the punched sheet 210, as will be described in further detail herein below.

[0072] A preferred embodiment provides for the equipment 100 to comprise at least one handling element 15 to transfer at least one of said punched sheets 210 from the feeding zone 1 on the forming device 20.

[0073] Said handling element 15 can also be made by an anthropomorphic robot.

[0074] This allows picking up the punched sheet 210 from the feeding zone 1 and placing it at the forming die 2.

[0075] Said die 2 is preferably configured to be positioned at operator-accessible height so as to facilitate an intervention, especially to solve forming issues.

[0076] In a possible configuration form, the forming device 20 may comprise even more than one die 2.

[0077] This allows for the forming of multiple trays 200 simultaneously, increasing the manufacturing rate of the equipment 100.

[0078] Advantageously, the die 2 comprises forming walls 21, 22, 23, 24.

[0079] Said forming walls 21, 22, 23, 24 are preferably located parallel to the four sides of the punched sheet 210.

[0080] In order to be able to perform the deep drawing of the tray 200, said forming walls 21, 22, 23, 24 are movable such as to be able to be brought to a working position that is suitable for the type and the dimensions of the tray 200 to be formed.

[0081] Said forming walls 21, 22, 23, 24 shall be preferably positioned substantially at the creasing lines 211 onto which the folding of the flaps 203 can be carried out.

[0082] Said forming walls 21, 22, 23, 24 are preferably configured to translate away from/closer to each other.

[0083] When the type of the punched sheet 210 to be formed does not change, said forming walls 21, 22, 23, 24 preferably remain stationary in the same position, while a displacement is needed when the format of the punched sheet 210 to be processed changes.

[0084] According to an aspect of the invention, the punch 3 comprises forming members 31, 32, 33, 34.

[0085] Said forming members 31, 32, 33, 34 are in particular positioned parallel to the four sides of the punched sheet 210.

[0086] In particular said, forming members 31, 32, 33, 34 can be parallel to any bevels that are present between the sides of the punched sheet 210.

[0087] Said forming members 31, 32, 33, 34 are preferably parallel to the forming walls 21, 22, 23, 24 of the die 2.

[0088] In order to be able to perform the deep drawing of the tray 200, said forming members 31, 32, 33, 34 are movable so as to be able to be brought to a working position that is suitable for the type and the dimensions of the tray 200 to be formed.

[0089] Said forming members 31, 32, 33, 34 must preferably be positioned substantially at the creasing

lines 211 onto which the folding of the flaps 203 is to be carried out.

[0090] Said forming members 31, 32, 33, 34 are preferably configured to translate away from/closer to each other.

[0091] When the type of the punched sheet 210 to be formed does not change, said forming members 31, 32, 33, 34 remain preferably stationary in the same position, while a displacement is needed when the format of the punched sheet 210 to be processed changes.

[0092] A preferred embodiment depicted in the figure provides for the die 2 to be in a stationary position and the punch 3 is movable with a reciprocating rectilinear motion, adapted to act as a pusher for the forced insertion of said sheet 210 into said forming walls 21, 22, 23, 24.

[0093] According to an aspect of the invention, said punch 3 comprises fluidic suctioning means 35.

[0094] Said fluidic suctioning means 35 grip the punched sheet 210.

[0095] In such a manner, the punch 3 retains said punched sheet 210 during its movement inside the die 2.

[0096] Said fluidic suctioning means 35 can be suction cups 35', as depicted in the figure.

[0097] According to an advantageous aspect, said fluidic suctioning means 35 are movable so as to be able to be brought in a working position that is suitable for the type and the dimensions of the tray 200 to be formed.

[0098] In particular said fluidic suctioning means 35 are configured to translate away from/closer to each other.

[0099] When the type of punched sheet 210 to be formed does not change, said fluidic suctioning means 35 preferably remain stationary in the same position, while a displacement can be needed when the format of the punched sheet 210 to be processed changes, in particular when the dimensions of the base 201 change.

[0100] According to a preferred embodiment, said fluidic suctioning means 35 are installed on the forming members 31, 32, 33, 34.

[0101] Said fluidic suctioning means 35 can be movable integrally with the forming members 31, 32, 33, 34.

[0102] In particular said fluidic suctioning means 35 can be mechanically associated with the forming members 31, 32, 33, 34 of the punch 3.

[0103] In order to complete the forming of the tray 200, the forming device 20 comprises auxiliary means 8 to fold and/or fix flaps 203 and/or fins 202 of said punched sheet 210 being processed.

[0104] Said auxiliary means 8 preferably comprise folding members 85, 86, 87, 88 to fold the fins 203 on the flap 202 before the fixing thereof.

[0105] According to an advantageous aspect, said folding members 85, 86, 87, 88 are movable so as to be able to be brought in a working position that is suitable for the type and dimensions of the tray 200 to be formed.

[0106] In particular said folding members 85, 86, 87, 88 are configured to translate away from/closer to each other.

[0107] When the type of punched sheet 210 to be

formed does not change, said folding members 85, 86, 87, 88 preferably remain stationary in the same position, while a displacement is needed when the format of the punched sheet 210 to be processed changes.

[0108] According to a preferred embodiment, said folding members 85, 86, 87, 88 are installed on the forming die 2.

[0109] Said folding members 85, 86, 87, 88 can be movable integrally with the forming walls 21, 22, 23, 24.

[0110] In particular said folding members 85, 86, 87, 88 can be mechanically associated with the forming walls 21, 22, 23, 24 of the die 2.

[0111] According to an embodiment, said auxiliary means 8 comprise locking members 81, 82, 83, 84 to fix said flaps 203 to the fins 202.

[0112] The securing may preferably occur by means of interlocking and/or adhesive bonding and/or staple locking.

[0113] Therefore, said locking members 81, 82, 83, 84 as a function of the type of securing provided for on the tray 200 can comprise glue guns, as depicted in the figure, when the tray provides for a securing between fin 202 and flap 203 by using glue.

[0114] Alternatively, said locking members 81, 82, 83, 84 can be actuators configured to exert an interlocking action, for example, of a portion of the fin 202 in a length of a flap 203, or vice versa, when the type of securing provided for on the tray 200 is an interlocking one.

[0115] Alternatively, said locking members 81, 82, 83, 84 can comprise staple guns to insert a staple between a portion of the fin 202 and a length of a flap 203, when the type of securing provided for on the tray 200 is by means of staples.

[0116] According to an advantageous aspect, said locking members 81, 82, 83, 84 are movable so as to be able to be brought in a working position that is suitable for the type and the dimensions of the tray 200 to be formed.

[0117] In particular said locking members 81, 82, 83, 84 are configured to translate away from/closer to each other.

[0118] When the type of punched sheet 210 to be formed does not change, said locking members 81, 82, 83, 84 preferably remain stationary in the same position, while a displacement is needed when the format of the punched sheet 210 to be processed changes.

[0119] According to a preferred embodiment, said locking members 81, 82, 83, 84 are installed on the forming die 2.

[0120] Said locking members 81, 82, 83, 84 can be movable integrally with the forming walls 21, 22, 23, 24.

[0121] According to an advantageous embodiment, the forming device 20 comprises a centering device 4 to center the punched sheet 210 prior to the forming of the tray 200.

[0122] This allows having the punched sheet 210 in a proper position that is parallel to the forming walls 21, 22, 23, 24 of the die 2.

[0123] As depicted in the figure, said centering device 4 may comprise holding members 41, 42, 43, 44 that are opposite each other in pairs, which, by a relative displacement, contact the sides of said punched sheet 210.

[0124] The displacement of said holding members 41, 42, 43, 44 preferably takes place at each forming cycle, not only upon a format change.

[0125] In particular said centering device 4 is driven by the control unit U during the operational cycle of the equipment 100 to position said holding members 41, 42, 43, 44 at a corresponding size as a function of the dimensions of the base 201 of the tray 200.

[0126] According to a possible embodiment, the centering device 4 can coincide with the die 2, in particular the holding members 41, 42, 43, 44 coincide with the forming walls 21, 22, 23, 24.

[0127] The subject matter of the invention is an equipment 100 in which said feeding zone 1 comprises a plurality of magazines 10.

[0128] In particular, each of said magazines 10 is configured to hold punched sheets 210 of different dimensions or types, preferably arranged on top of each other to form a stack 250.

[0129] Said magazines 10 can be configured so that the loading of the stack 250 therein occurs automatically, for example, fed by a line of conveyors.

[0130] Alternatively, they can be ground magazines 10, i.e., configured so that the insertion of the stack 250 takes place directly by a forklift and/or LGV.

[0131] Such plurality of magazines 10 allows having different punched sheets 210 available for forming, which will be selected based on the requirements of the machines downstream or, in general, the production needs.

[0132] The at least one element 15 is preferably configured to be able to pick up the punched sheets 210 from each magazine 10.

[0133] Said handling element 15 preferably comprises activating means 15a to rotate and/or translate parallel to the working plane at the magazines 10 and the forming device 20, in particular of the die 2.

[0134] In the case where the magazines 10 are numerous or arranged in such a way that they are not all accessible by a single handling element 15, the equipment 100 may include two or more handling elements 15.

[0135] Said one or more handling elements 15 can also be configured to handle edges and/or thermoformed items and/or already-formed trays or caps, possibly even manually fed at one or more magazines 10.

[0136] Even in the case where the forming device 20 comprises more than one die 2, multiple handling elements 15 could be provided, each capable of interfacing with a specific die 2.

[0137] According to a preferred embodiment, the punch 3 can be installed on the handling element 15.

[0138] This simplifies the equipment 100.

[0139] The subject matter of the invention is also the forming device 20 comprising adjusting means 5, 6, 7 to adapt the dimensions thereof to the different sizes of a

punched sheet 210 and of the corresponding tray 200 to be formed.

[0140] Advantageously, said adjusting means 5, 6, 7 are driven by the control unit U, which manages the operation of the equipment 100

[0141] Therefore, by virtue of this solution, it is possible to form the different punched sheets 210 contained in the various magazines 10 in an automatic and preferably continuous manner, i.e., without necessarily stopping the equipment 100 to make the adjustments required for the different format of sheet 210 to be processed.

[0142] According to a preferred embodiment, said adjusting means 5, 6, 7 comprise a first adjusting device 5, to adapt the dimensions of the die 2.

[0143] Preferably said adjusting means 5, 6, 7 comprise a second adjusting device 6, to adapt the dimensions of the punch 3.

[0144] Furthermore, said adjusting means 5, 6, 7 preferably comprise a third adjusting device 7 to adapt the position of the auxiliary means 8.

[0145] Advantageously, said adjusting means 5, 6, 7 comprise respective actuations, for example, electric or pneumatic motors or actuators and possible transmission means to adapt in an automatic manner the dimensions of the die 2 and/or the punch 3, and/or of the auxiliary means 8.

[0146] By virtue of this solution, it is possible to fully adapt the forming device 20 to the corresponding format of punched sheet 210 and tray 200 without manual interventions, but through the management and controls of the control unit U.

[0147] Advantageously the first adjusting device 5, and/or the second adjusting device 6, and/or the third adjusting device 7 are driven by the control unit U to respectively adapt the dimensions of the die 2, and/or the dimensions of the punch 3, and/or to adapt the position of the auxiliary means 8, during the operational cycle of the equipment 100.

[0148] Therefore, this allows an automatic change of format that does not involve any stop of the equipment 100 to make different trays 200.

[0149] In particular, the forming walls 21, 22, 23, 24 of the die 2 are mechanically associated with the first adjusting device 5 driven by the control unit U preferably during the operational cycle of the equipment 100 to position them at a corresponding size as a function of the dimensions of the base 201 of the tray 200.

[0150] Preferably, the forming members 31, 32, 33, 34 and/or means of the punch 3 are mechanically associated with the second adjusting device 6 driven by the control unit U preferably during the operational cycle of the equipment 100 to position them at a corresponding size as a function of the dimensions of the base 201 of the tray 200.

[0151] In particular, the second adjusting device 6 activates the translation of the forming members 31, 32, 33, 34 away from/closer to each other.

[0152] When the dimensions of the base 201 of the tray

200 do not change, said forming members 31, 32, 33, 34 preferably remain stationary in the same position during the operational forming cycle of the tray 200 and the control unit U does not activate the second adjusting device 6.

[0153] The displacement may be needed when the format of the punched sheet 210 to be processed changes, in particular when the dimensions of the base 201 change, in which case, via the control unit, the second adjusting device 6 activates the translation of the forming members 31, 32, 33, 34 during the operational cycle of the equipment 100.

[0154] According to a preferred embodiment, as already described herein above, the fluidic suctioning means 35 can be installed on the forming members 31, 32, 33, 34.

[0155] Said fluidic suctioning means 35 can be movable integrally with the forming members 31, 32, 33, 34.

[0156] In such a case, it is the second adjusting device 6, driven by the control unit U, that, by positioning the forming members 31, 32, 33, 34, locates said fluidic suctioning means 35 at a corresponding size as a function of the dimensions of the base 201 of the tray 200.

[0157] Further preferably the locking members 81, 82, 83, 84 and/or the folding members 85, 86, 87, 88 are mechanically associated with the third adjusting device 7 driven by a control unit U, preferably during the operational cycle of the equipment 100 to position them at a corresponding size as a function of the type, and the dimensions of the tray 200 to be formed.

[0158] In particular, the third adjusting device 7 activates the translation of the locking members 81, 82, 83, 84 and/or of the folding members 85, 86, 87, 88 away from/closer to each other.

[0159] When the type and dimensions of the punched sheet 210 to be formed do not change, said locking members 81, 82, 83, 84 and/or folding members 85, 86, 87, 88 preferably remain stationary in the same position during the operational forming cycle of the tray 200, and the control unit U does not activate the third adjusting device 7.

[0160] The displacement may be needed when the format of the punched sheet 210 to be processed changes, in which case, via the control unit, the third adjusting device 7 activates the translation of the locking members 81, 82, 83, 84 and/or of the folding members 85, 86, 87, 88 during the operational cycle of the equipment 100.

[0161] According to a preferred embodiment, as already described herein above, said locking members 81, 82, 83, 84 and/or folding members 85, 86, 87, 88 are installed on the forming die 2.

[0162] Said locking members 81, 82, 83, 84 and/or folding members 85, 86, 87, 88 can be movable integrally with the forming walls 21, 22, 23, 24.

[0163] In particular, said locking members 81, 82, 83, 84 and/or folding members 85, 86, 87, 88 can be mechanically associated with the forming walls 21, 22, 23,

24 of the die 2.

[0164] In such a case, it is the first adjusting device 5 driven by the control unit U that, by positioning the forming walls 21, 22, 23, 24, locates said locking members 81, 82, 83, 84 and/or folding members 85, 86, 87, 88 at a corresponding size as a function of the dimensions of the base 201 of the tray 200.

[0165] By virtue of this solution, it is possible to manage a plurality of punched sheets 210 and corresponding trays 200 having different shape and dimensions.

[0166] Said control unit U is configured to manage a plurality of recipes, each relating to a corresponding punched sheet 210 or tray 200.

[0167] Therefore, depending on the tray 200 required, for example, by machines downstream, for example, a palettizer, the control unit U drives the handling element 15 so that it positions itself on the magazine 10 containing the punched sheet 210 suitable for making the required tray 200.

[0168] Said control unit U drives the forming device 20 so that both the die 2 and the punch 3 adjust all their parts to receive and form the punched sheet 210 to be picked up, in particular the forming walls 21, 22, 23, 24, the forming members 31, 32, 33, 34, the folding members 85, 86, 87, 88, and/or the locking members 81, 82, 83, 84.

[0169] Said control unit U provides for preferably executing these controls during the operational cycle of the equipment 100, in order to switch from a punched sheet 210 to another continuously, without having to stop the equipment 100.

[0170] At this moment, the handling element 15 picks up from the magazine 10 the punched sheet 210 suitable to make the required tray 200 and brings it to the die 2.

[0171] In the case where the punch 3 is installed on the handling element 15 before picking up the sheet 210, the forming members 31, 32, 33, 34, must have been positioned as driven by the control unit U, according to the dimensions of the punched sheet 210 to be formed.

[0172] The fluidic suctioning means 35 of the punch 3 release the sheet 210 on the die 2, and said sheet 210 is centered by the centering device 4.

[0173] Once the sheet 210 has been centered, the fluidic suctioning means 35 can take charge of the sheet 210 again, and the punch 3 is inserted into the die 2 by a rectilinear motion along a preferably vertical straight line, performing a stroke that is preferably based on the height of the flaps 203 of the tray 200.

[0174] Concomitantly, the auxiliary means 8 intervene in order to complete the forming of the tray 200.

[0175] It is the object of the invention also the method for making edged trays 200 starting from punched sheets 210, which provides for picking up a punched sheet 210 from a feeding zone 1 and bringing it at a forming device 20 to form the tray 200.

[0176] Said method provides for forming trays 200 of different dimensions or types by picking up punched sheets 210 of different dimensions or types from a plurality of magazines 10.

[0177] Said method preferably provides for adapting the forming device 20 to the different sizes and configurations of the punched sheet 210 and of the corresponding tray 200 to be formed.

[0178] In particular, said method provides for adapting the forming device 20 during the operational cycle, to the different sizes of a punched sheet 210 and of the corresponding tray 200 to be formed.

[0179] It is however understood that what has been described above is for exemplary, non-limiting purposes only. Therefore, any variations of detail that may be necessary for technical and/or functional reasons are to be hereafter considered as falling within the same protective scope defined by the claims set forth below.

Claims

1. An equipment (100) for making edged trays (200) starting from punched sheets (210), comprising a feeding zone (1) to hold a plurality of said punched sheets (210), a forming device (20) configured to form the tray (200) and at least one handling element (15) to transfer at least one of said punched sheets (210) from said feeding zone (1) to said forming device (20), **characterized in that** said feeding zone (1) comprises a plurality of magazines (10), each configured to hold punched sheets (210) of different dimensions or types, preferably arranged on top of each other to form a stack (250), and said forming device (20) comprises adjusting means (5, 6, 7) driven by a control unit (U) to adapt the dimensions of said forming device (20) to the different sizes of a punched sheet (210) and the corresponding tray (200) to be formed.
2. The equipment (100) according to the preceding claim, wherein the forming device (20) comprises at least one forming die (2) and at least one corresponding punch (3) configured to form the tray (200) by fitting into/disengaging from each other.
3. The equipment (100) according to the claim 2, wherein the die (2) and the punch (3) fit into/disengage from each other by a reciprocating rectilinear motion along a preferably vertical straight line.
4. The equipment (100) according to any one of the preceding claims, wherein the forming device (20) comprises auxiliary means (8) to fold and/or fix flaps (203) and/or fins (202) of said punched sheet (210) being processed.
5. The equipment (100) according to any one of the claims 2 to 4, wherein said adjusting means (5, 6, 7) comprise a first adjusting device (5), to adapt the dimensions of the die (2), and/or a second adjusting device (6), to adapt the dimensions of the punch (3), and/or a third adjusting device (7) to adapt the position of the auxiliary means (8).
6. The equipment (100) according to any one of the claims 2 to 5, wherein said first adjusting device (5) and/or the second adjusting device (6), and/or the third adjusting device (7) are driven by the control unit (U) to respectively adapt the dimensions of the die (2), and/or the dimensions of the punch (3), and/or to adapt the position of the auxiliary means (8), during the operational cycle of the equipment (100).
7. The equipment (100) according to any one of the preceding claims, wherein the at least one handling element (15) comprises activating means (15a) to rotate and/or translate at the magazines (10) and the forming device (2).
8. The equipment (100) according to any one of the claims 5 to 7, wherein the die (2) comprises forming walls (21, 22, 23, 24) configured to translate away from/closer to each other and mechanically associated with the first adjusting device (5) driven by the control unit (U) preferably during the operational cycle of the equipment (100) to position them at a corresponding size as a function of the dimensions of the base (201) of the tray (200).
9. The equipment (100) according to any one of the claims 5 to 8, wherein the punch (3) comprises forming members (31, 32, 33, 34) configured to translate away from/closer to each other and mechanically associated with the second adjusting device (6) driven by the control unit (U) preferably during the operational cycle of the equipment (100) to position them at a corresponding size as a function of the dimensions of the base (201) of the tray (200).
10. The equipment (100) according to any one of the claims 5 to 9, wherein the auxiliary means (8) comprise folding members (85, 86, 87, 88) to fold the fins 203 on the flap 202 before the fixing thereof, and/or locking members (81, 82, 83, 84) to fix said flaps (203) with the fins (202), preferably by means of interlocking and/or adhesive bonding and/or staple locking, configured to translate away from/closer to each other and mechanically associated with the third adjusting device (7) driven by the control unit (U), preferably during the operational cycle of the equipment (100) to position them at a corresponding size as a function of the type and the dimensions of the tray (200) to be formed.
11. The equipment (100) according to any one of the claims 4 to 10, wherein the auxiliary means (8) are installed on the die (2).

12. The equipment according to any one of the claims 2 to 11, **characterized in that** said punch (3) comprises fluidic suctioning means (35), preferably suction cups (35'), for retaining said at least one punched sheet (210). 5
13. The equipment (100) according to any one of the claims 8 to 12, wherein the die (2) is in a stationary position and the punch (3) is movable with a reciprocating rectilinear motion, adapted to act as a pusher 10 for the forced insertion of said sheet (210) into said forming walls (21, 22, 23, 24).
14. The equipment (100) according to any one of the claims 2 to 13, wherein the punch (3) is installed on the handling element (15). 15
15. Method for making edged trays (200) starting from punched sheets (210), performed by the equipment (100), which provides for picking up the punched 20 sheet (210) from the feeding zone (1) and to bring it at the forming device (20) to form the tray (200), **characterized in that** said method provides for forming trays (200) of different dimensions or types 25 by picking up punched sheets (210) of different dimensions or types from a plurality of magazines (10), and provides for adapting the forming device (20) to the different sizes and configurations of the punched sheet (210) and of the corresponding tray (200) to be formed. 30
16. The method according to claim 15, which provides for adapting the forming device (20) during the operational cycle, to the different sizes of a punched sheet (210) and of the corresponding tray (200) to be 35 formed.

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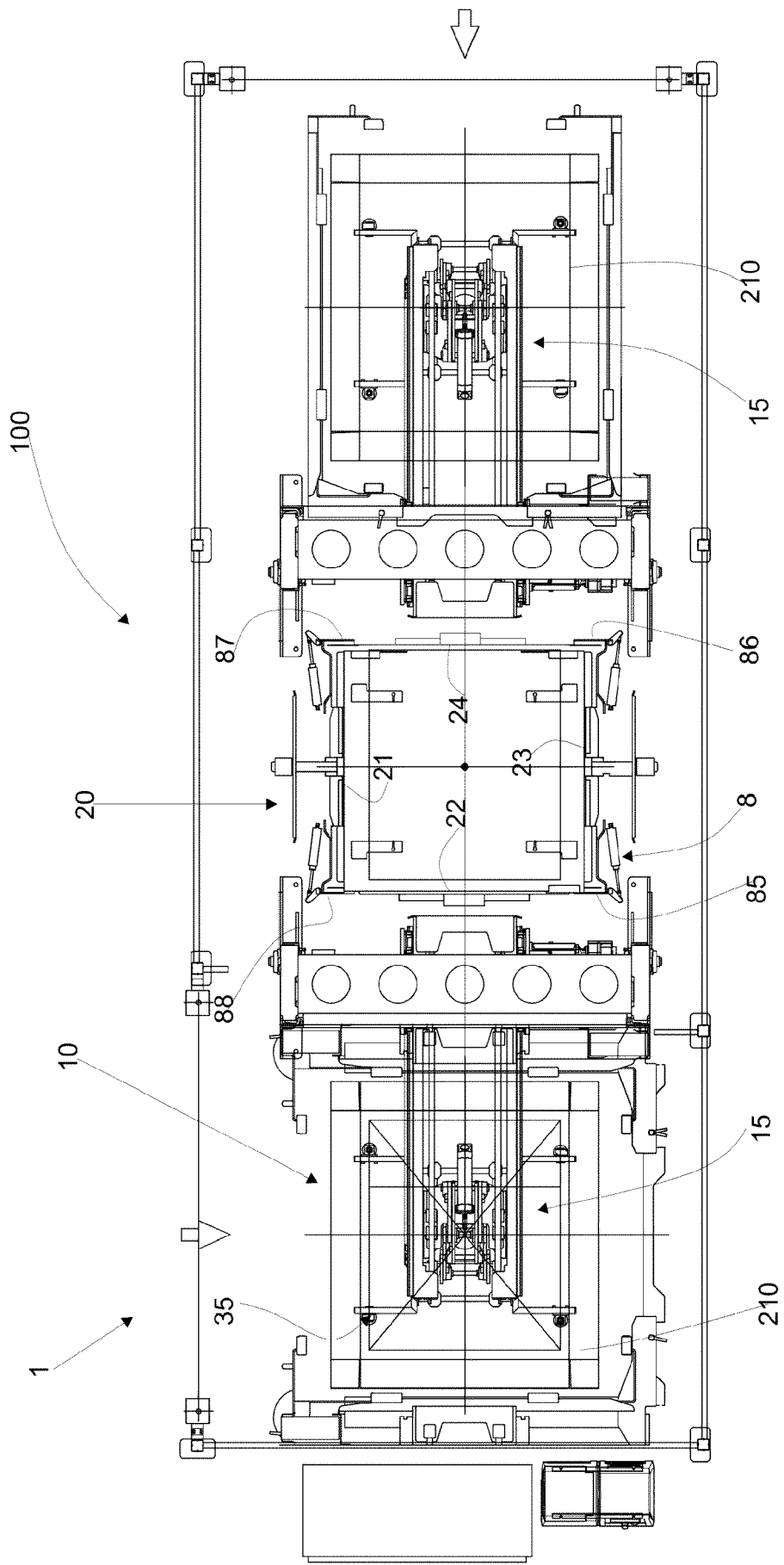


Fig.1a

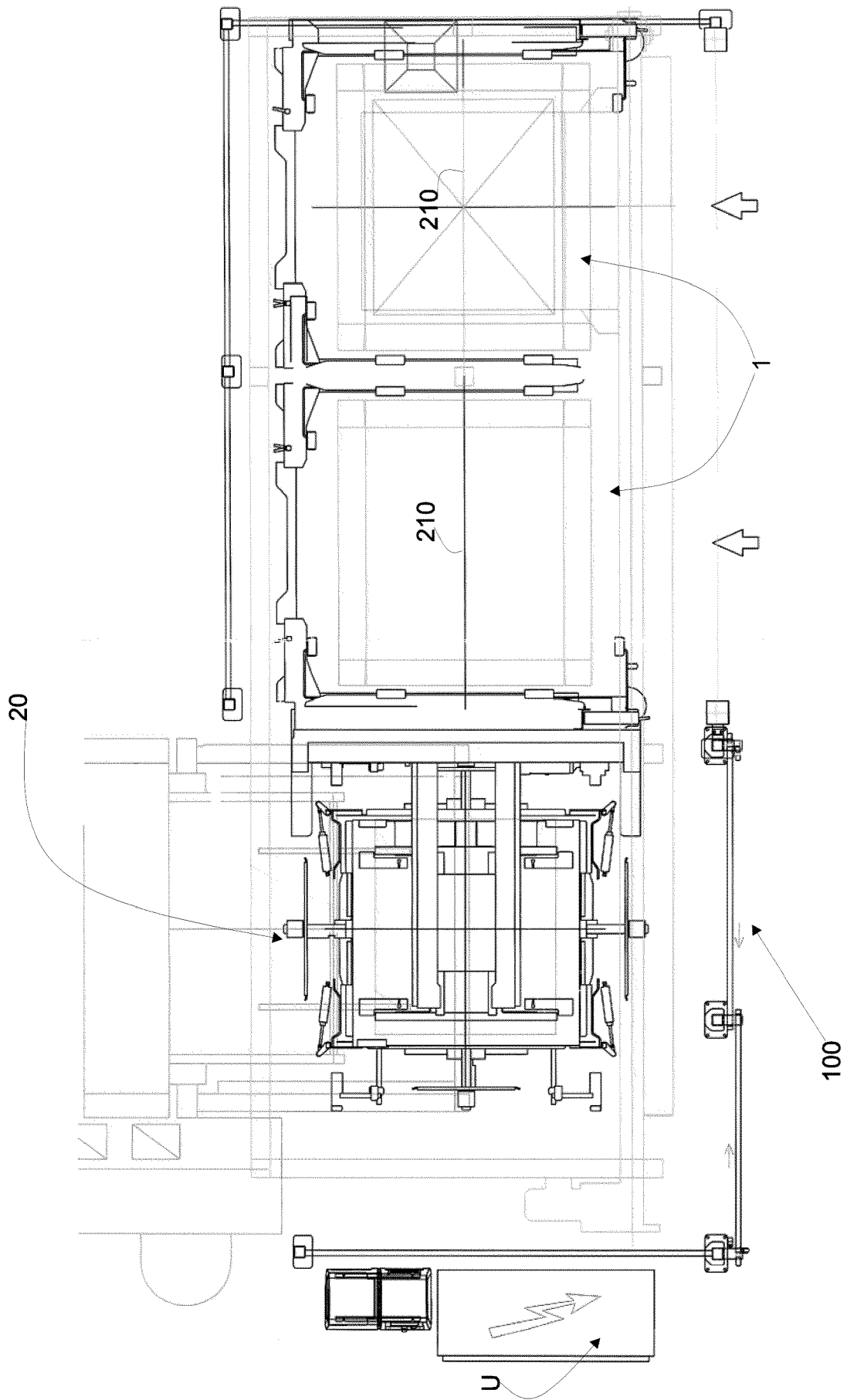


Fig.1b

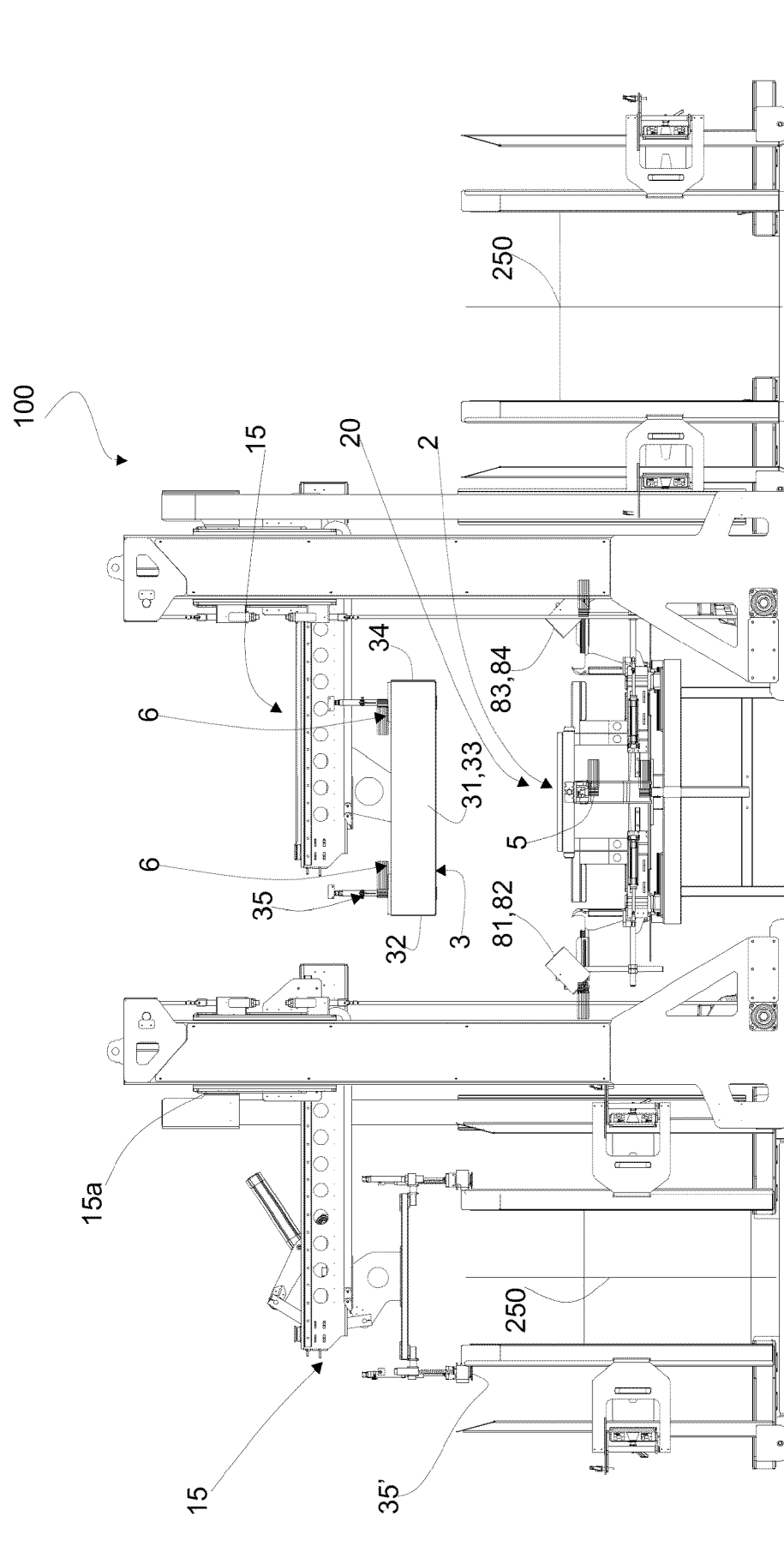


Fig. 2a

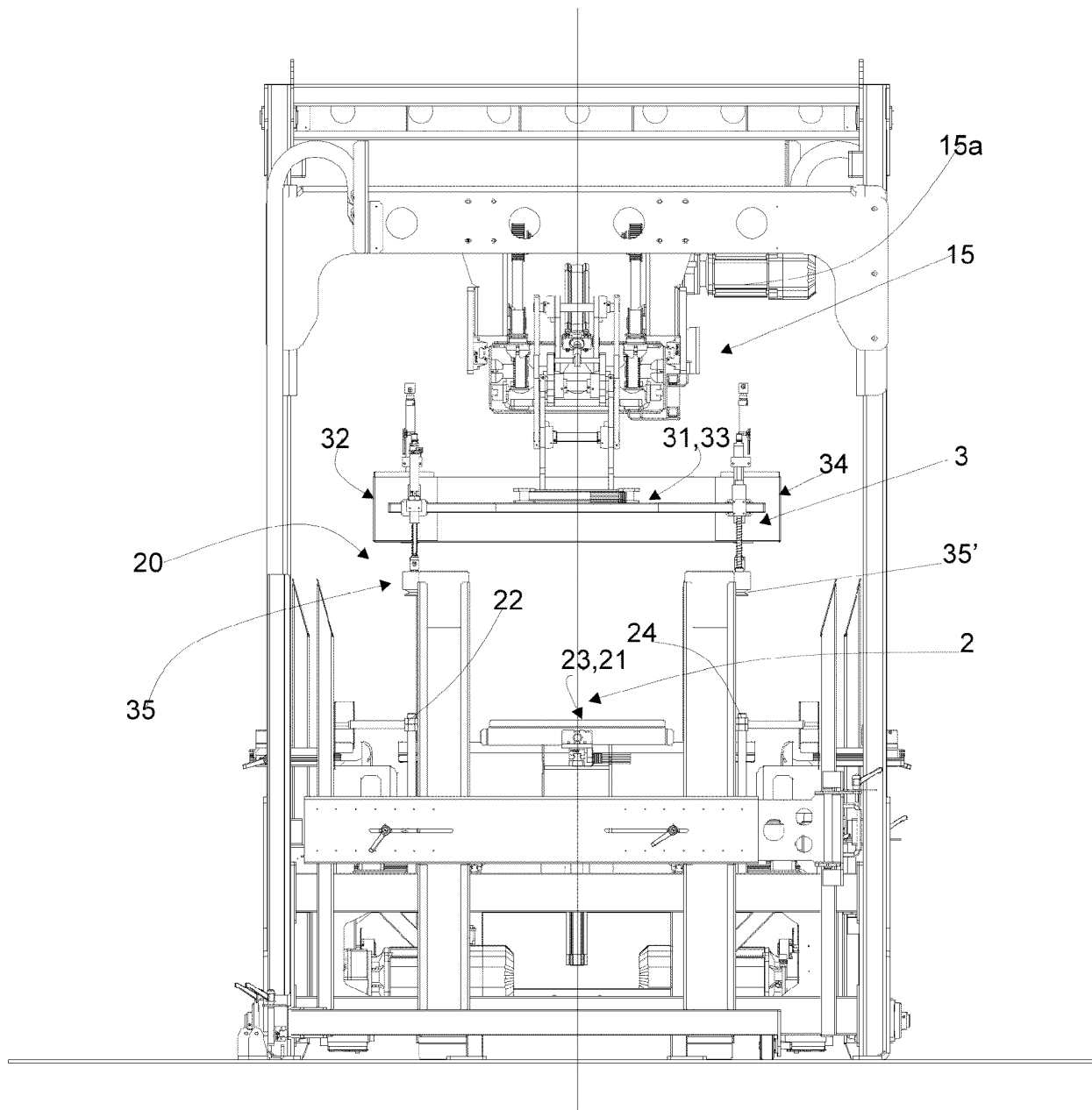


Fig.2b

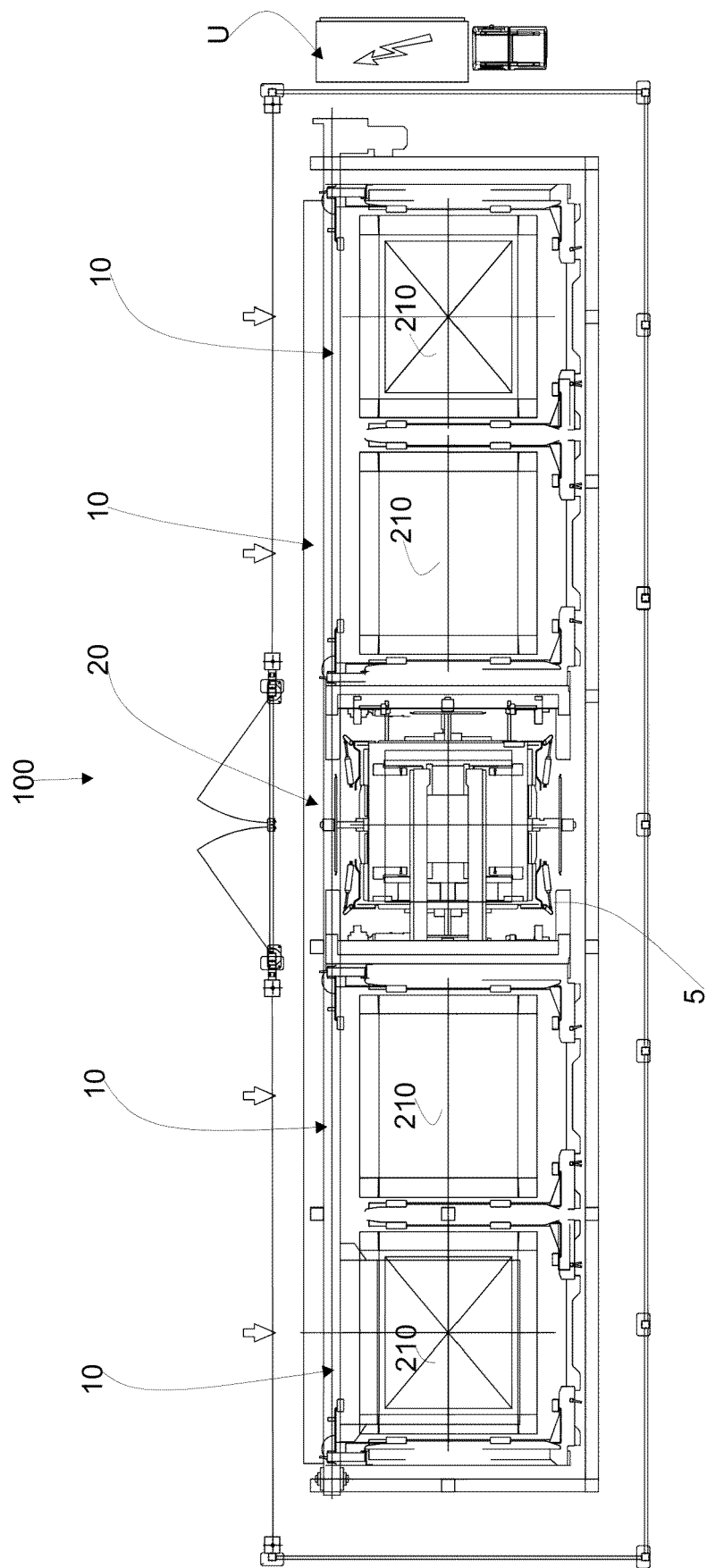


Fig.3a

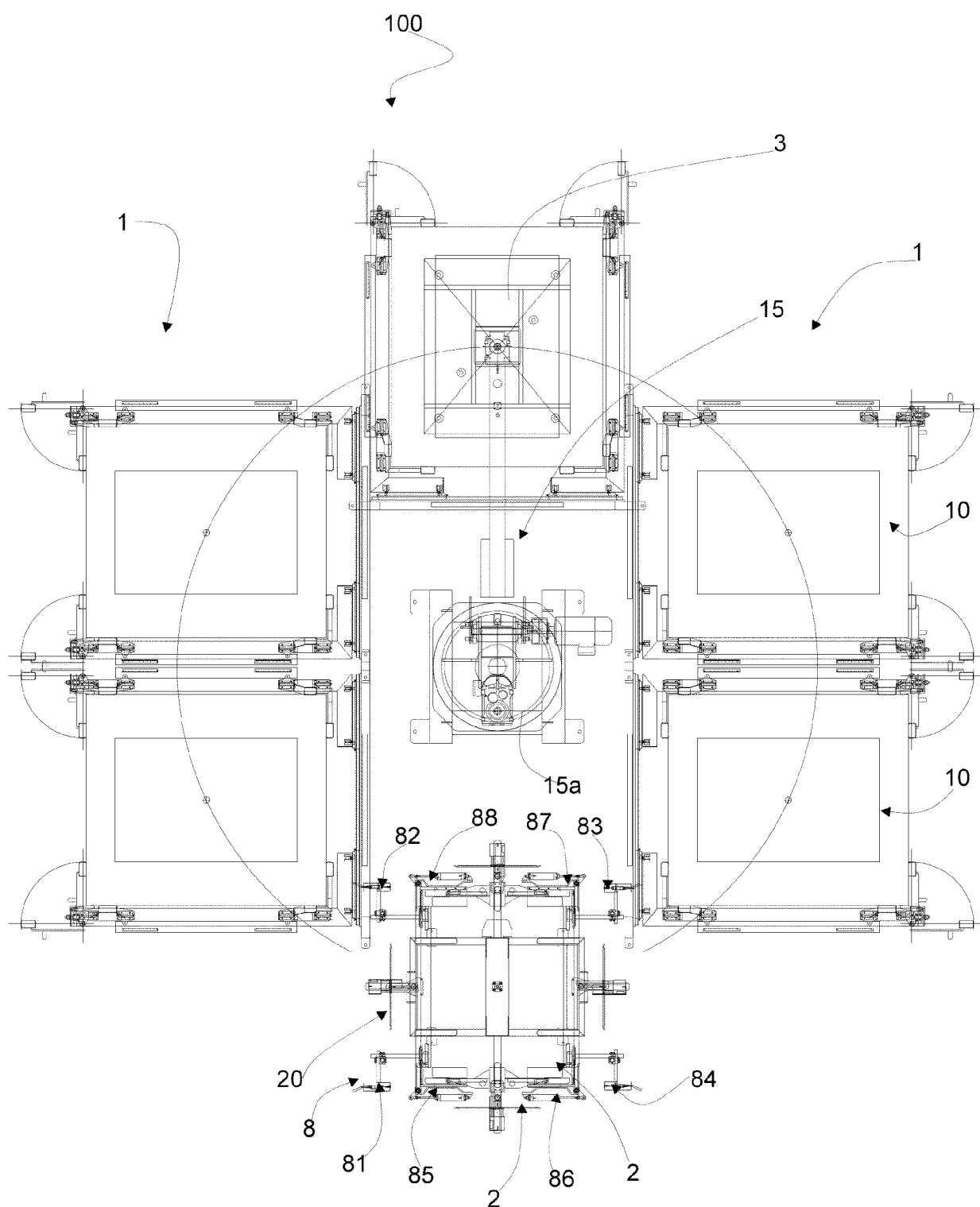


Fig.3b

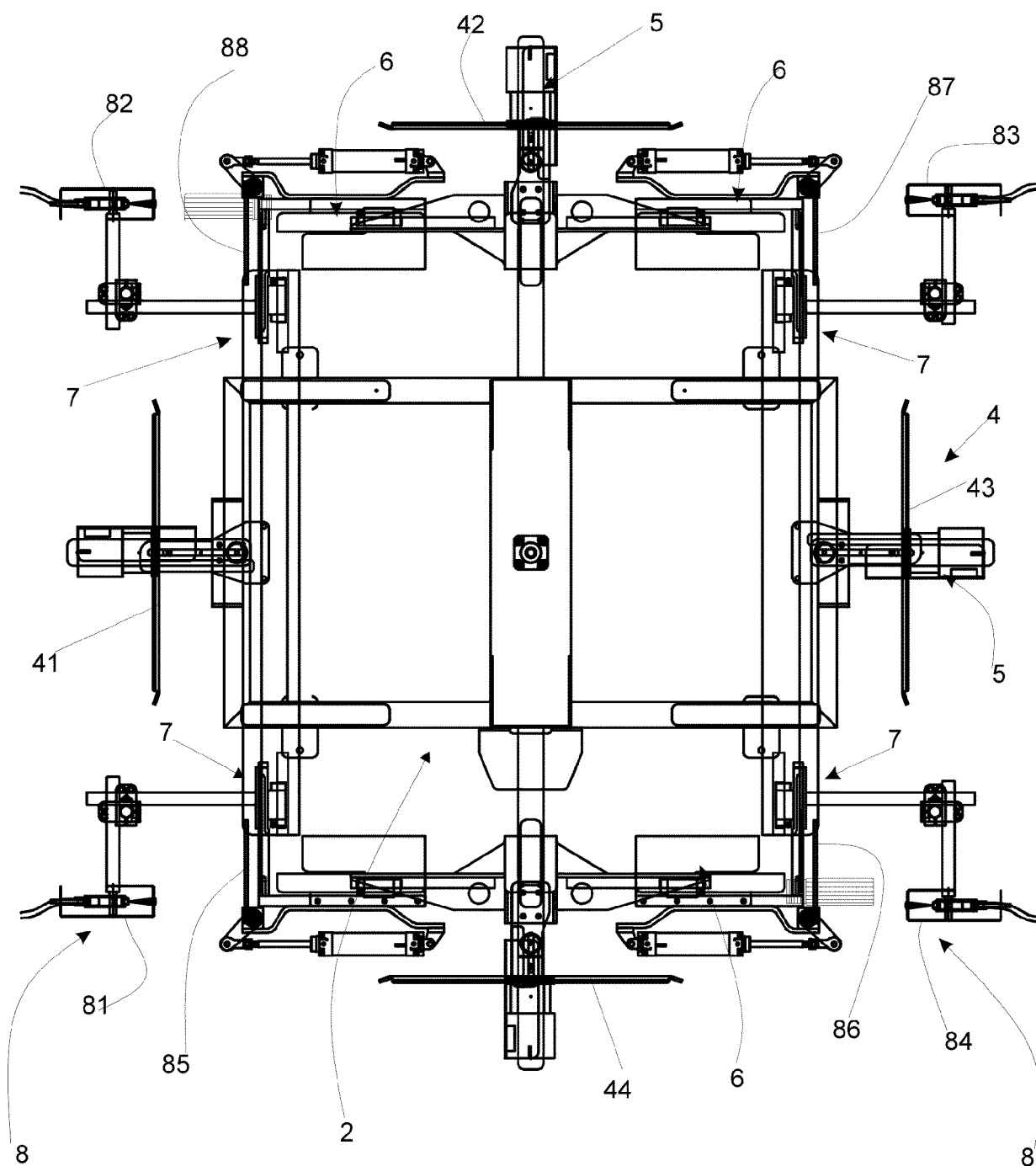
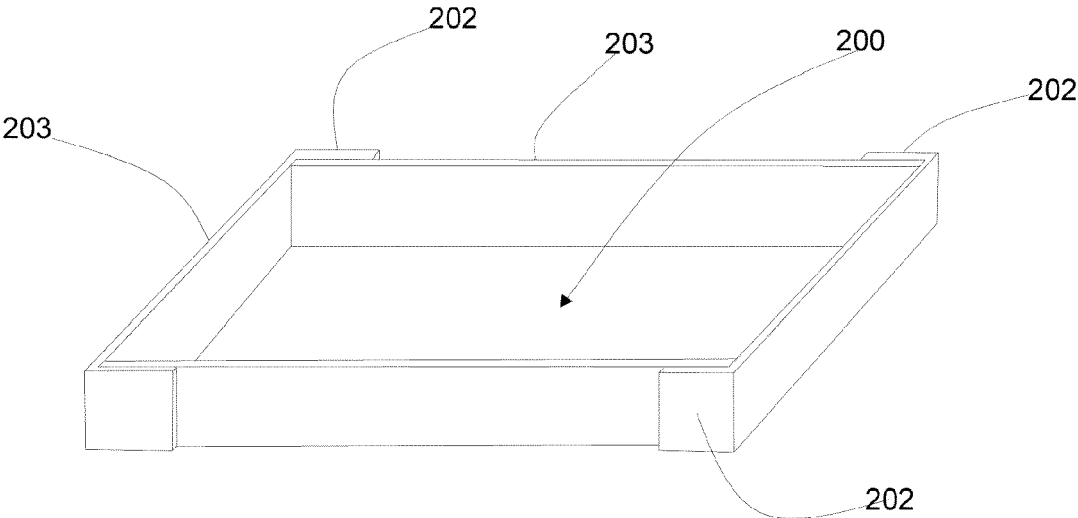
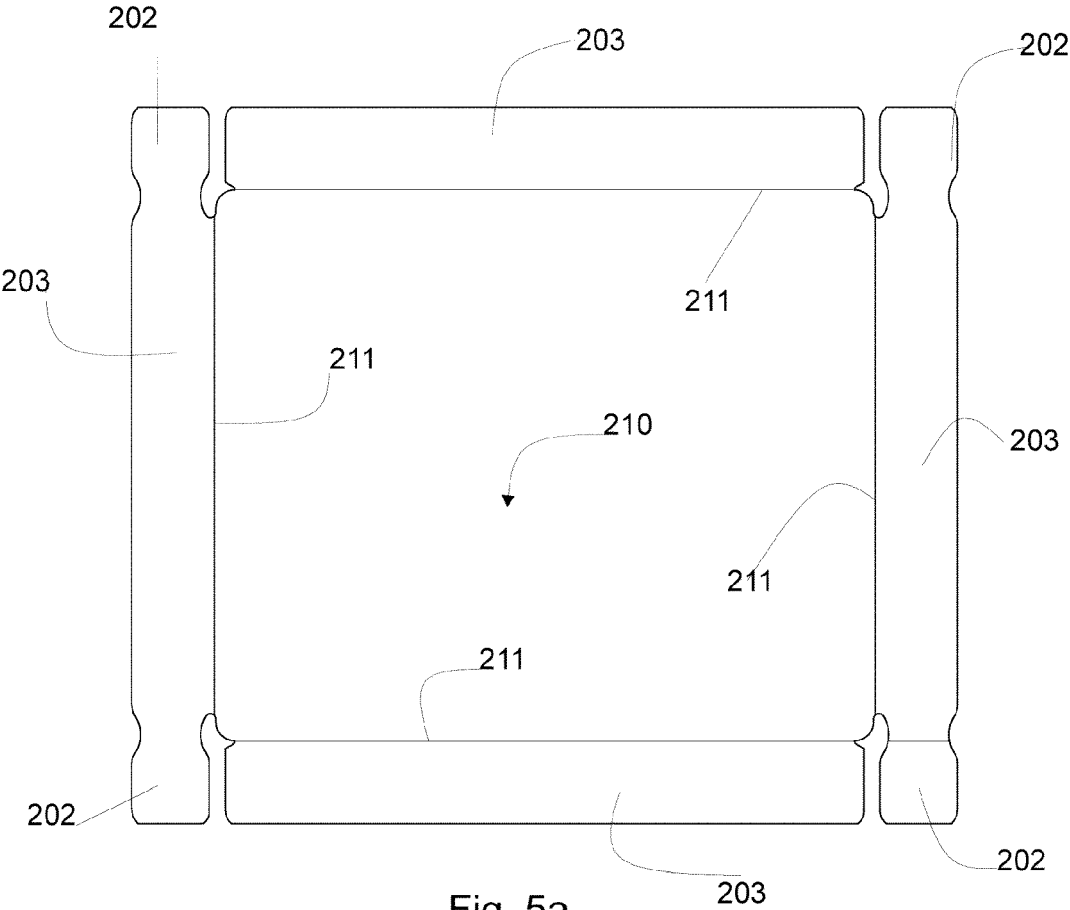


Fig.4





EUROPEAN SEARCH REPORT

Application Number

EP 24 20 1718

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			B31B B65B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		17 January 2025	Cardoso, Victor
CATEGORY OF CITED DOCUMENTS			
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17-01-2025

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EP 4147986 A2	15-03-2023	NONE	

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