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(54) **DEVICE AND METHOD FOR REALISING VENTILATED STABILIZING COVERINGS FOR PALLETISED LOADS**

(57) A device (1) for making ventilation holes in a stabilizing covering (21) for a palletized load (22) which is extended according to a vertical axis (Z), a transverse axis (Y) and a longitudinal axis (X), the axes being perpendicular to each other, the device (1) is connected to an end (26) of a mechanical manipulator or an industrial robot and comprises at least one perforating head (2; 2a, 2b) which includes at least one frame (3) with at least two perforating apparatuses (4) for making the ventilation holes in the covering (21); the perforating apparatuses (4) comprise a support (6) for a perforating tip (7), the frame (3) comprises one or more linear guide and support elements (5, 50, 51) in order to connect the perforating apparatuses (4) to the frame (3), and first actuators (9) are provided for the perforating apparatuses (4) which are thus linearly translatable along the linear guide and support elements (5, 50, 51), by means of the first movement actuators (9) which selectively and automatically move the position of the perforating apparatuses (4) with respect to the frame (3); a method is also provided for making the ventilation holes by means of the device (1).

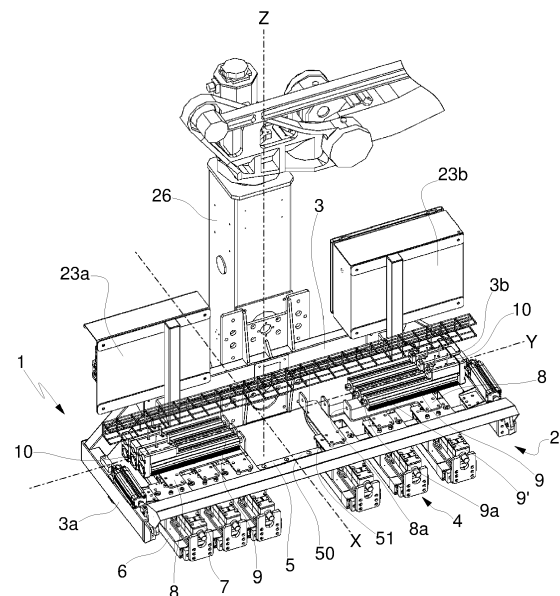


FIG. 1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention refers to a device and to a method for making ventilated stabilizing coverings for palletized loads, the aforesaid palletized loads being obtained with plastic films.

STATE OF THE ART

[0002] Equipment is known for making stabilizing coverings of ventilated type, obtained with plastic films, for palletized loads. It is known that the plastic films, after having been wound around a palletized load, according to conventional methods, are perforated by means of a device which comprises a plurality of perforating tips associated with a movable support structure, so as to attain a plurality of ventilation holes in the covering. With this expedient, one prevents the moisture of the air within the stabilizing covering from condensing on the products of the load, deteriorating them, or prevents it from wetting other objects of the load or other elements of the pack, damaging it.

[0003] One example of such device is described in the European patent EP1721830B1, in the name of the same Applicant.

[0004] Such device, i.e. a perforating station in an industrial packing line, comprises a conveyor belt, adapted to move the palletized loads covered with plastic films along an advancing direction, and a perforating machine placed on the side of the conveyor device itself.

[0005] The perforating machine can be selectively moved close to and away from the palletized load. The perforating machine comprises a series of perforating tips which are arranged along vertical rows to form a perforating matrix. Each of the perforating tips comprises a heatable head which locally softens the stabilizing covering in a manner such that, by mechanical action, the perforating tip can then perforate the stabilizing covering.

[0006] The perforating tips are fixed to a support wall, connected to the support structure, by means of mechanical fixing means, e.g. clamp devices. Such tips are adapted to attain the ventilation holes on the plastic films at the empty spaces between one product and the next.

[0007] For example, in the case of bottles, in addition to the spaces between one bottle and the next, the ventilation holes could also be made at the necks of the bottles themselves, so long as the perforating tips do not go too much in depth, but the current perforating machines do not allow this precision.

[0008] The position of the empty spaces, at which the ventilation holes are made, is variable from one palletized load to the next due to the different dimensions of the covered products.

[0009] Therefore, it is necessary to each time modify the position of the ventilation holes to be made, by modifying the position of the perforating tips along the support

wall. In such sense, it is necessary to manually intervene on the fixing means of the perforating tips, with a machine stop whose stop time is variable as a function of the modifications to be made.

[0010] In addition, the new positioning of the perforating tips must be verified before proceeding with the perforation of the covering of the palletized load in order to prevent damaging the products themselves.

[0011] Another example of a device for making holes in stabilizing coverings is described in the European patent EP2850005B1, in the name of the same Applicant.

[0012] Such device comprises a support structure provided with a fixed base and with a vertical structure which is extended substantially according to a vertical axis, i.e. perpendicular to the support surface of the device, a perforating head positioned on the vertical structure and provided with perforating tips for making ventilation holes in the stabilizing covering.

[0013] Vertical actuators are provided for moving the perforating head according to the vertical axis along the vertical structure itself.

[0014] The perforating head essentially comprises a horizontal row of perforating tips whose relative distance must be previously adjusted based on the dimensions and shape of the products that form the palletized load, and systems are not described for automatically obtaining the adjustment of the relative distance of the perforating tips.

[0015] There is therefore the need to be able to automatically vary the position of the perforating tips with respect to the palletized load, reducing the machine stop times required for adapting, each time, the position of the perforating tips in relation to other size and arrangement of the palletized products.

[0016] In addition, there is the need to be able to arrange a device which increases the productivity of the machine for perforating the stabilizing coverings of the palletized loads, i.e. it would be useful to arrange a machine that allows making an increased number of holes in the covering of the palletized load, given the same time employed. In addition, the device for perforating the stabilizing coverings of the palletized loads must be able to be easily integrated with an existing line for covering the palletized loads, increasing the production flexibility thereof with limited costs.

OBJECTS OF THE INVENTION

[0017] One object of the invention is to improve the state of the prior art.

[0018] A further object of the invention is to propose a device for making ventilation holes in stabilizing coverings of palletized loads, which allows automatically modifying the perforation arrangement, eliminating the machine stop times.

[0019] Another object of the invention is to propose a device for making ventilation holes in stabilizing coverings of palletized loads which can be easily integrated in

an existing line for covering palletized loads.

[0020] In accordance with one aspect of the invention, a device is provided for making ventilation holes in stabilizing coverings of palletized loads according to claim 1.

[0021] The present invention, in addition, relates to a method for making ventilation holes in stabilizing coverings of palletized loads according to claim 16.

[0022] The dependent claims refer to preferred and advantageous embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Further characteristics and advantages of the invention will be more evident from the detailed description of a preferred but not exclusive embodiment of a device for making ventilation holes in stabilizing coverings of palletized loads with plastic films, illustrated by way of a non-limiting example in the enclosed drawing tables in which:

figure 1 is a top perspective view of a device for perforating stabilizing coverings of palletized loads according to the present invention;

figure 2 is a bottom perspective view of the perforating device according to the present invention;

figure 3 is a front view of the perforating device according to the present invention;

figure 4 is a side view of the perforating device according to the present invention, in perforating position;

figure 5 is a perspective view of the perforating device according to another embodiment of the invention; and

figure 6 is a rear view of the perforating device according to the embodiment shown in figure 5.

EMBODIMENTS OF THE INVENTION

[0024] With reference to the enclosed figures, reference number 1 overall indicates a device for making ventilation holes in a stabilizing covering 21 of a palletized load 22 (only partially illustrated in figure 4).

[0025] The stabilizing covering 21 can for example be a covering made of plastic films or another similar material.

[0026] The palletized load 22 is substantially extended according to a vertical axis "Z", a transverse axis "Y" and a longitudinal axis "X", the aforesaid three axes being perpendicular to each other in space like the three Cartesian axes.

[0027] The device 1 is connected to a terminal part of a mechanical manipulator by means of a bracket 26, for example a tubular element arranged according to the vertical axis "Z"; the device 1 can be moved along the axes "X", "Y", "Z" and rotated around the vertical axis "Z".

[0028] The mechanical manipulator can comprise an industrial robot of Cartesian or anthropomorphic type.

[0029] In the embodiment shown in the figures, the me-

chanical manipulator is an anthropomorphic industrial robot with four degrees of freedom; according to other embodiments of the invention, it is possible to provide for a mechanical manipulator or an industrial robot with more or less degrees of freedom, as a function of the design, productivity and economic needs.

[0030] The device 1 comprises at least one perforating head 2, which includes a support frame 3 on which at least two perforating means 4 are arranged, the support frame 3 is in turn connected to an end of a mechanical manipulator or an industrial robot, exemplified by a bracket 26.

[0031] In the embodiment reported in figures 1 to 4, a perforating head 2 is depicted comprising six perforating means 4, arranged on the frame 3 according to a line substantially parallel to the transverse axis "Y", therefore the frame 3 is also extended horizontally according to the transverse axis "Y".

[0032] Nevertheless, further embodiments of the device 1 are possible, comprising a higher number of perforating heads 2 and/or comprising at least two perforating means 4. Hence there can be any number of perforating means 4 starting from two; in addition, also the support frame 3 can be extended and be arranged differently, depending on the design, productivity and economical needs and without departing from the protective scope of the invention.

[0033] According to an embodiment of the invention not illustrated in the figures, the support frame 3 for the perforating means 4 could be extended, and be positioned, according to the vertical axis "Z", consequently the perforating means 4 could be arranged on the frame 3 according to a line substantially parallel to the vertical axis "Z".

[0034] According to the latter version of the invention, the device 1 attains the ventilation holes in the stabilizing covering 21 for vertical rows, and during operation the industrial robot moves the device 1 horizontally according to the transverse axis "Y".

[0035] In addition, in the embodiment shown in the figures 5 and 6, the device 1 comprises two vertically-superimposed perforating heads 2a, 2b, which are substantially extended along the transverse axis "Y", each comprising six perforating means 4 and each supported by a respective frame 3.

[0036] In the embodiment of figures 5 and 6, the vertical bracket 26 comprises a vertical guide 24, the lower perforating head 2a is directly fixed to the bracket 26 with the upper perforating head 2b is connected to the bracket 26 by means of sliding blocks 27 slidable on the aforesaid guide 24.

[0037] The upper perforating head 2b is moved according to the vertical axis "Z" by means of actuator means 25, such as for example one or more electrical, pneumatic or hydraulic actuators; in the executive version shown in figures 5 and 6, two actuator means 25 are provided to the right and left of the bracket 26 for an improved balancing of thrust of the actuators on the upper perforating

head 2b.

[0038] As stated above, there can be any number of actuators for moving the upper perforating head 2b; in addition, the upper perforating head 2b could be fixed to the bracket 26 and the lower perforating head 2a could be slidable on the guide 24.

[0039] In addition, there could still be more than two perforating heads, further increasing the productivity of the device 1.

[0040] Due to the presence of two or more perforating heads, the capacity to make holes of the device 1 is increased, i.e. substantially doubled, or multiplied corresponding to the number of perforating heads, and at the same time the device 1 maintains the flexibility to be able to change the position of holes, being able to vary the vertical distance between the two perforating heads 2a, 2b.

[0041] According to a further version of the invention not illustrated in the figures, the device 1 with two perforating heads 2a, 2b, could have the perforating heads arranged according to the vertical axis "Z" and laterally approached according to the transverse axis "Y"; in this case, the device 1 makes the ventilation holes in the stabilizing covering 21 for double vertical rows, and during operation the industrial robot moves the device 1 horizontally according to the transverse axis "Y".

[0042] Returning to the embodiments illustrated in the figures, the frame 3 is arranged substantially according to the transverse axis "Y" and has, as is in particular seen in figure 1, an essentially C-shaped plan form, comprising two ends 3a, 3b to which a bar 5 is fixed which connects such ends 3a, 3b.

[0043] Naturally, the C-shaped plan form is only a non-limiting example, and the frame 3 can be made of any shape suitable for the support of the perforating heads 2 and of the other parts of the device 1.

[0044] On the bar 5, linear guide and support means are provided which comprise a linear guide 50 with at least one respective slidable support 51 for each of the perforating means 4; due to this embodiment, the perforating means 4 are supported and guided with precision on the bar 5 and have the possibility of being linearly translated along the aforesaid linear guide 50.

[0045] Each of the perforating means 4 comprises a support 6 for a perforating tip 7, in turn the support 6 is operatively associated with the first movement means 9 by means of connection means 8; the latter comprise suitably shaped plates which connect the supports 6 to the respective first movement means 9.

[0046] The first movement means 9 can selectively move the position of each of the perforating means 4 with respect to the frame 3 and specifically along the bar 5 as better indicated in the course of the description.

[0047] The first movement means 9 comprise, for example, a linear electrical actuator 9', and according to other embodiments of the invention can comprise a linear actuator of any type: hydraulic, pneumatic, etcetera, depending on the requirements.

[0048] In the embodiment reported in the figures, the first movement means 9 comprise linear electrical actuators 9' of commercial type: generally, this type of actuator comprises a tubular element of substantially cylindrical type, which has a screw/nut screw mechanism at its interior, driven by an electric motor 10, such mechanism moves a stem 9a in a manner analogous to that of the actuators of hydraulic or pneumatic type.

[0049] In the embodiment shown in figures 1 to 4, six actuators 9' are present, provided with respective stems 9a fixed in the holes 8a of the respective connection means 8. Naturally, other embodiments can also be provided with a higher or lower number of electrical actuators.

[0050] Due to the thrust generated by the actuator 9', by means of the stem 9a, the linear displacement of the perforating means 4 along the guide 50 is determined, and in the end the position is moved.

[0051] In the embodiment shown in the figures, for the electrical actuators 9' can provide for the suitable electrical wiring adapted to allow a correct operation of the same and of all the electrical components of the device 1.

[0052] In particular, two containers 23a, 23b are provided which respectively enclosed the electrical wiring of the left and right zone of the device 1.

[0053] In the embodiment shown in the figures 5 and 6, two perforating heads 2a, 2b being provided, there are four containers 23a, 23b, 23c, 23d which enclose the respective electrical wiring of the upper right zone, upper left zone, lower right zone and lower left zone of the device 1, even if the aforesaid wiring could be grouped in a smaller number of containers.

[0054] Each perforating tip 7 comprises a heatable head 11 which is provided in order to soften the stabilizing covering - made of thermoplastic material - of the palletized load with which it comes into contact, so as to make a hole therein.

[0055] The temperature of the heatable head 11 is controllable and adjustable in an electronic mode. In such a manner, one reduces the current consumption necessary for heating the same and consequently the operating costs of the device 1 are optimized.

[0056] Each support 6 comprises a fork 12, in proximity to the end of the heatable head 11, which faces the palletized load.

[0057] As illustrated in embodiment of figure 2, the fork 12 has a vertical slot 12a for the passage of the heatable head 11 and for allowing a vertical adjustment of the heatable head 11 within the slot 12a itself.

[0058] As illustrated more in detail in figure 2, the fork 12 allows a correct positioning of the heatable head 11 with respect to the stabilizing covering of the palletized load.

[0059] Indeed, the fork 12 acts as an abutment for the heatable head 11, preventing the same from overly advancing within the stabilizing covering 21, thus preventing other damage of the palletized products.

[0060] In the event that the load 22 is composed of

bottles (figure 4) it is therefore possible to make the holes also at the necks of the bottles themselves.

[0061] In addition, each fork 12, during the step of moving the perforating means 4 away from the case, facilitates the detachment between the heatable head 11 and the stabilizing covering itself. In such a manner, in fact, one prevents the stabilizing covering from adhering to the single heatable heads 11 and hence from being subjected to a traction that could damage the integrity thereof during the movement of the perforating means 4 away from palletized load.

[0062] The perforating head 2 can also comprise movable dividing wall 13 for protecting the perforating means 4.

[0063] The movable dividing wall 13 is connected in a rotary mode to the frame 3 by means of a pair of hinges 14. Each hinge 14 is placed at an end of the movable dividing wall 13. The hinges 14 determine a rotation of the movable dividing wall 13 around an axis substantially parallel to the transverse axis "Y", or to the vertical axis "Z", which is parallel to the frame 3.

[0064] The movable dividing wall 13 is rotatable between a lowered position, in which covers the perforating means 4, and a raised position in which it leaves the perforating means 4 uncovered, and vice versa.

[0065] In lowered position, the movable dividing wall 13 provides for protecting the perforating means 4 and above all protecting the possible operators in the vicinity of the device 1, preventing the same from hurting themselves by coming into contact with the heatable heads 11.

[0066] In addition, the movable dividing wall 13 can be completely closed and insulated in order to reduce the thermal dispersion of the perforating means 4.

[0067] The movable dividing wall 13 can be associated with automatic driving means 16. Such automatic driving means 16 provides for rotating the movable dividing wall 13 from the raised position to the lowered position and vice versa.

[0068] The automatic driving means 16, for example, can comprise an actuator, provided with a movement stem, with pneumatic or hydraulic actuation, or actuation with a similar element adapted for such purpose.

[0069] In an exemplifying but non-limiting version of the automatic driving means 16, the exit of the stem of the actuator determines the rotation of the movable dividing wall 13 around the axis substantially parallel to the transverse axis "Y", causing the lowering thereof. Vice versa, the return of the stem of the actuator causes the raising of the movable dividing wall 13.

[0070] In addition, each support 6 comprises at least one slide 17, to which the perforating tip 7 is fixed, and second movement means 18 of the at least one slide 17.

[0071] The second movement means 18 comprise a pneumatic cylinder, or the like, which provides for moving the perforating means 4 towards the palletized load 22, so as to bring the perforating tip 7 close to or away from the covering of the palletized load 22 and substantially according to the longitudinal axis "X".

[0072] In other embodiments, the second movement means 18 could be without any limitation linear electrical actuators, hydraulic jacks, etcetera.

[0073] The perforating means 4 can therefore be independently brought close to or away from each other along the transverse axis "Y" - or along the vertical axis "Z" - by means of the first movement means 9 which move the connection means 8 and, along the longitudinal axis "X", by means of the second movement means 18 which move the at least one slide 17.

[0074] In this manner, it is possible to quickly, automatically and precisely modify the arrangement of the perforation to be executed in the stabilizing covering 21.

[0075] It is also possible to move the entire perforating head 2, along the longitudinal axis "X", by means of the industrial robot which moves the end to which the device 1 for making ventilation holes is fixed.

[0076] A control unit (not shown in the figures) is also provided for the automated management of the industrial robot and of the device 1.

[0077] In particular, the control unit provides for automatically managing:

the movement of the robotic arm of the industrial robot according to the degrees of freedom that it possesses;

the movement of each of the perforating means 4 in a direction moving close to or away from the palletized load 22, according to the longitudinal axis "X";
the movement of the movable dividing wall 13 from the raised position to the lowered position and vice versa;

the positioning of each of the perforating means 4 along the frame 3, according to the transverse axis "Y", or according to the vertical axis "Z".

[0078] In addition, in the embodiment shown in figures 5 and 6, the control unit also provides for managing the mutual distance, along the vertical axis "Z", or the transverse axis "Y", between the lower perforating head 2a and the upper perforating head 2b (or right perforating head 2a and left perforating head 2b).

[0079] Hereinbelow, a method will be described for making ventilation holes in stabilizing coverings for palletized loads.

[0080] The method according to the present invention initially provides for a step of positioning the palletized load 22 in proximity to the industrial robot, for example through a power supply line not illustrated in the figures.

[0081] Subsequently, a step is provided for positioning the device 1 at the height defined by the type of product which composes the load 22.

[0082] Such step is obtained, for example by means of the industrial robot which suitably supplies the end to which the device 1 is fixed.

[0083] In the event that the device 1 comprises two perforating heads, as illustrated in figures 5 and 6, a step is provided for adjusting the distance of the two perforat-

ing heads 2 along the vertical axis "Z" based on the type of product which composes the load 22.

[0084] Then, a step is provided for arranging the perforating means 4 along the transverse axis "Y" according to a pre-established order based on the type of product which composes the load 22.

[0085] Then, a step is provided for advancing the perforating means 4 towards the load 22, bringing the heatable heads 11 and the respective forks 12 in contact with the stabilizing covering 21, according to the longitudinal axis "X".

[0086] The heatable heads 11 determine an initial softening of the stabilizing covering 21 and following the advancement of the perforating tips 7 towards the palletized load the perforation thereof is determined via mechanical action.

[0087] Therefore, a step is provided for the perforating means 4, according to the longitudinal axis "X", away from the palletized load 22.

[0088] Finally, once the attainment of the ventilation holes in the stabilizing covering 21 is completed, a step is provided for moving, by means of the industrial robot and according to the longitudinal axis "X", the perforating head 2 away from palletized load 22 in order to allow the moving away towards further processing stations or towards a storage, etcetera.

[0089] The device 1 allows automatically and quickly varying the arrangement of the holes made in a stabilizing covering of palletized loads.

[0090] The height of the perforating head 3 is modifiable in a quick and automatic manner and, therefore, allows attaining a correct perforation at the different layers of palletized products without requiring machine stops for modifying the position of the single perforating tips 7.

[0091] In addition, the spacing of the single perforating means 4 along the horizontal bar 5 is automatically modifiable in a very simple manner.

[0092] In addition, in the event that the device 1 has more than one perforating head 2, it is possible to automatically adjust the vertical distance between the aforesaid perforating heads, thus allowing savings also in terms of total time required for carrying out the perforation process.

[0093] The invention thus conceived is susceptible of numerous modifications and variations, all falling within the scope of the inventive concept as defined in the claims.

[0094] In addition, all the details can be substituted by other technically equivalent elements. In practice, the materials used, as well as the contingent shapes and sizes, can be of any type depending on the requirements, without departing from the protective scope of the following claims.

[0095] In the event that the technical characteristics mentioned in the claims are followed by reference numbers, such reference numbers are introduced with the only object of increasing the clarity of the claims, and

consequently the aforesaid reference numbers do not have a limiting effect on the interpretation of each element identified as an example by such reference numbers.

Claims

1. Device (1) for making ventilation holes in a stabilizing covering (21) for a palletized load (22), said load (22) being extended substantially according to a vertical axis (Z), a transverse axis (Y) and a longitudinal axis (X), said axes being perpendicular to each other, said device (1) being connected to an end (26) of a mechanical manipulator or an industrial robot and comprises at least one perforating head (2; 2a, 2b) which includes at least one frame (3) with at least two perforating means (4) for making said ventilation holes in said covering (21), said at least two perforating means (4) comprise a support (6) for a perforating tip (7), said frame (3) comprises one or more linear guide and support means (5, 50, 51) in order to connect said perforating means (4) to said frame (3), **characterized in that** it comprises one or more first movement means (9) for said perforating means (4), so that said perforating means (4) are linearly translatable along said linear guide and support means (5, 50, 51) by means of said one or more first movement means (9) selectively and automatically moving the position of said perforating means (4) with respect to said frame (3).
2. Device (1) according to claim 1, wherein said one or more first movement means (9) comprise a linear electrical actuator (9') or a linear hydraulic or pneumatic actuator.
3. Device (1) according to claim 1 or 2, comprising a connection means (8) in order to connect said perforating means (4) to said first movement means (9).
4. Device (1) according to the preceding claim, wherein said connection means (8) comprise suitably shaped plates.
5. Device (1) according to one of the preceding claims, wherein said perforating tip (7) comprises a heatable head (11) in order to soften said stabilizing covering (21) of said palletized load (22) for making ventilation holes.
6. Device (1) according to one of the preceding claims, wherein said support (6) comprises a slide (17), to which said perforating tip (7) is fixed.
7. Device (1) according to the preceding claim, wherein said support (6) comprises second movement means (18) for moving said slide (17) close to or away from said palletized load (22) and substantially

according to the longitudinal axis (X).

8. Device (1) according to the preceding claim, wherein said second movement means (18) are attained by means of one or more pneumatic cylinders and/or electrical cylinders and/or hydraulic cylinders and/or the like, provided for moving said slide (17) in the direction of the palletized load (22). 5
9. Device (1) according to one of the preceding claims, wherein said support (6) comprises, in proximity to the end of said heatable head (11) which faces said palletized load (22), a fork (12) intended to be placed in abutment against said stabilizing covering (21) of said palletized load (22). 10 15
10. Device (1) according to the preceding claim, wherein said fork (12) has a slot (12a) in order to allow the passage of said heatable head (11) and in a manner such to allow an adjustment of the relative vertical position between heatable head (11) and fork (12). 20
11. Device (1) according to one of the preceding claims, comprising a control unit for automatically managing the movement of each of the perforating means (4) in a direction moving close to or away from the palletized load (22) according to the longitudinal axis (X) and the positioning of each of the perforating means (4) along the frame (3), according to the transverse axis (Y). 25 30
12. Device (1) according to one of the preceding claims, comprising at least two perforating heads (2a, 2b) arranged along the vertical axis (Z), or along the transverse axis (Y). 35
13. Device (1) according to the preceding claim, wherein said perforating heads are connected to a guide (24) which allows the independent movement of said at least two perforating heads (2a, 2b) along the vertical axis (Z), or along the transverse axis (Y), by means of automatic movement means (25). 40
14. Method for making ventilation holes in a stabilizing covering (21) for a palletized load (22) by means of a device (1) according to one of the preceding claims, said palletized load (22) being extended according to a vertical axis (Z), a transverse axis (Y) and a longitudinal axis (X), said directions being perpendicular to each other, comprising the steps of: 45 50

positioning the palletized load (22) in proximity to the device (1);
 positioning the device (1) at a height defined by the type of product which composes the load (22);
 moving the perforating means (4) along the transverse axis (Y), or according to the vertical

axis (Z), according to a pre-established order based on the type of product which composes the load (22);
 advancing of the perforating means (4) towards said load (22), bringing said heatable heads (11) and the respective forks (12) in contact with the stabilizing covering (21), according to the longitudinal axis (X);
 perforating the stabilizing covering (21) of the load (22);
 moving the perforating means (4), according to the longitudinal axis (X), away from palletized load (22).
 moving, according to the longitudinal axis (X), the perforating head (2) away from the palletized load (22);

characterized in that

said step of moving the perforating means (4) automatically and selectively occurs by means of a control unit which manages one or more first movement means (9) for said perforating means (4).

15. Method according to the preceding claim, wherein said device (1) comprises at least two perforating heads (2a, 2b), and wherein the method comprises a step of adjusting the distance of said at least two perforating heads (2a, 2b) along the vertical axis (Z), or along the transverse axis (Y), as a function of the type of product which composes the load (22).

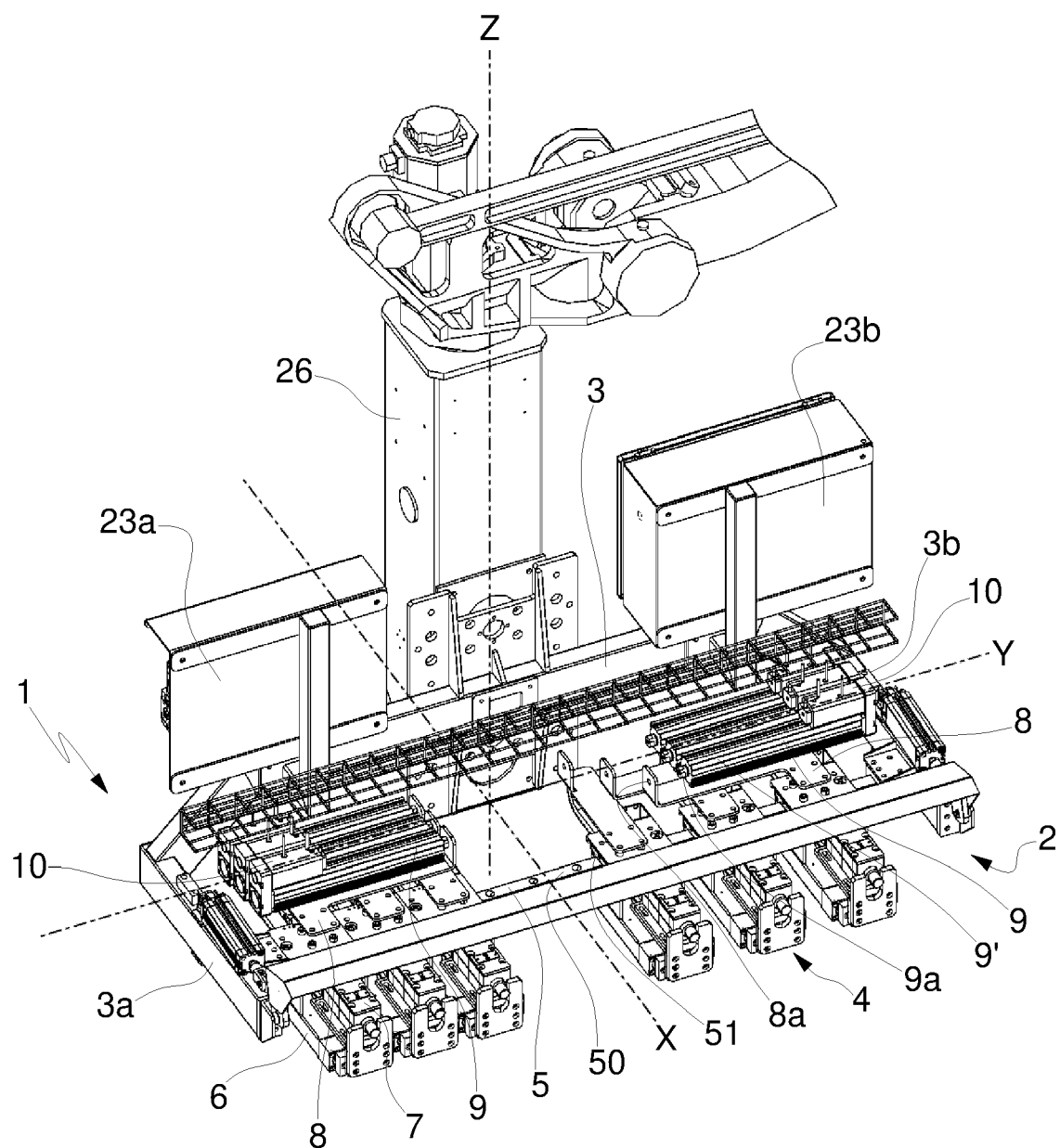


FIG. 1

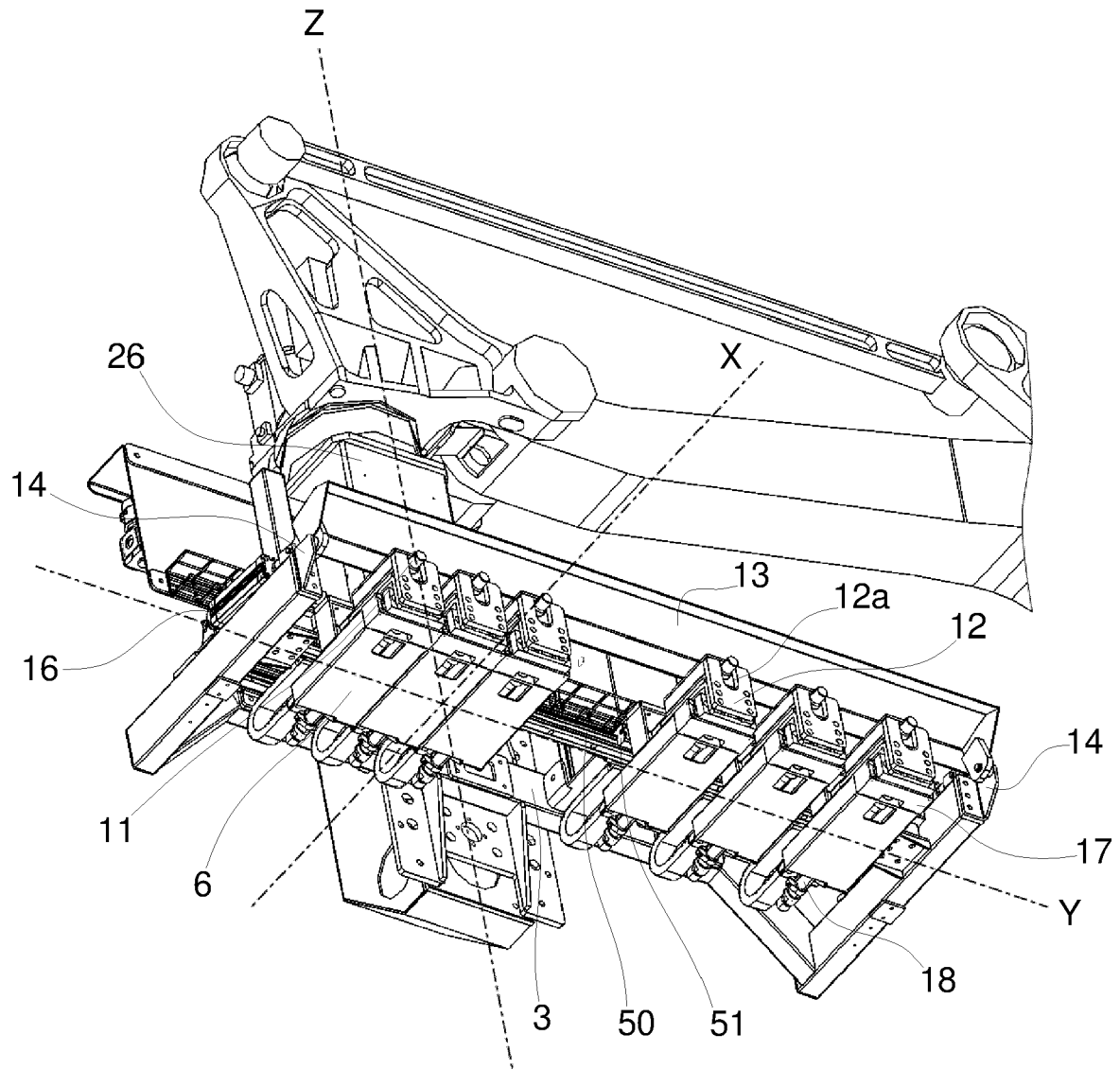


FIG. 2

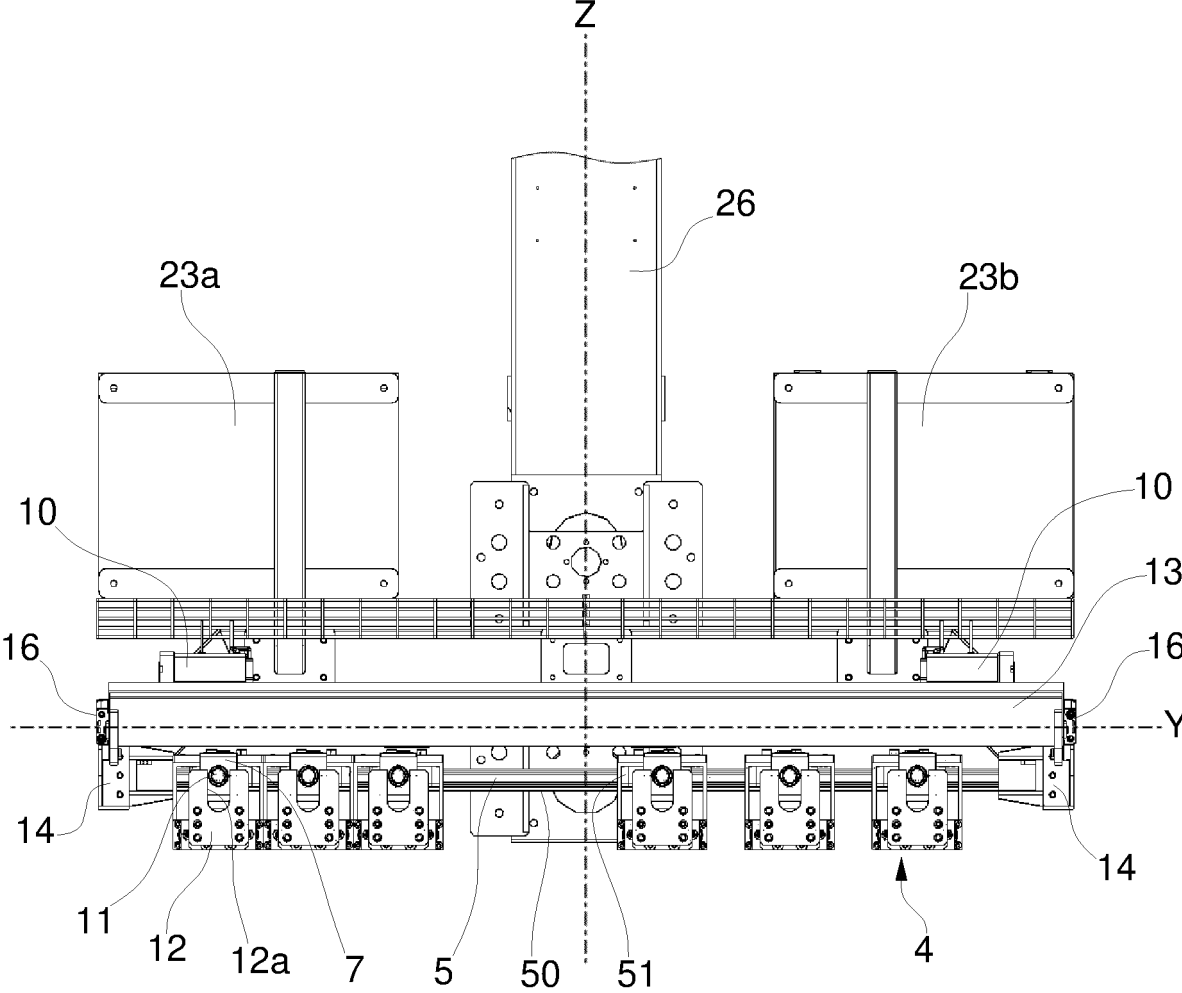


FIG. 3

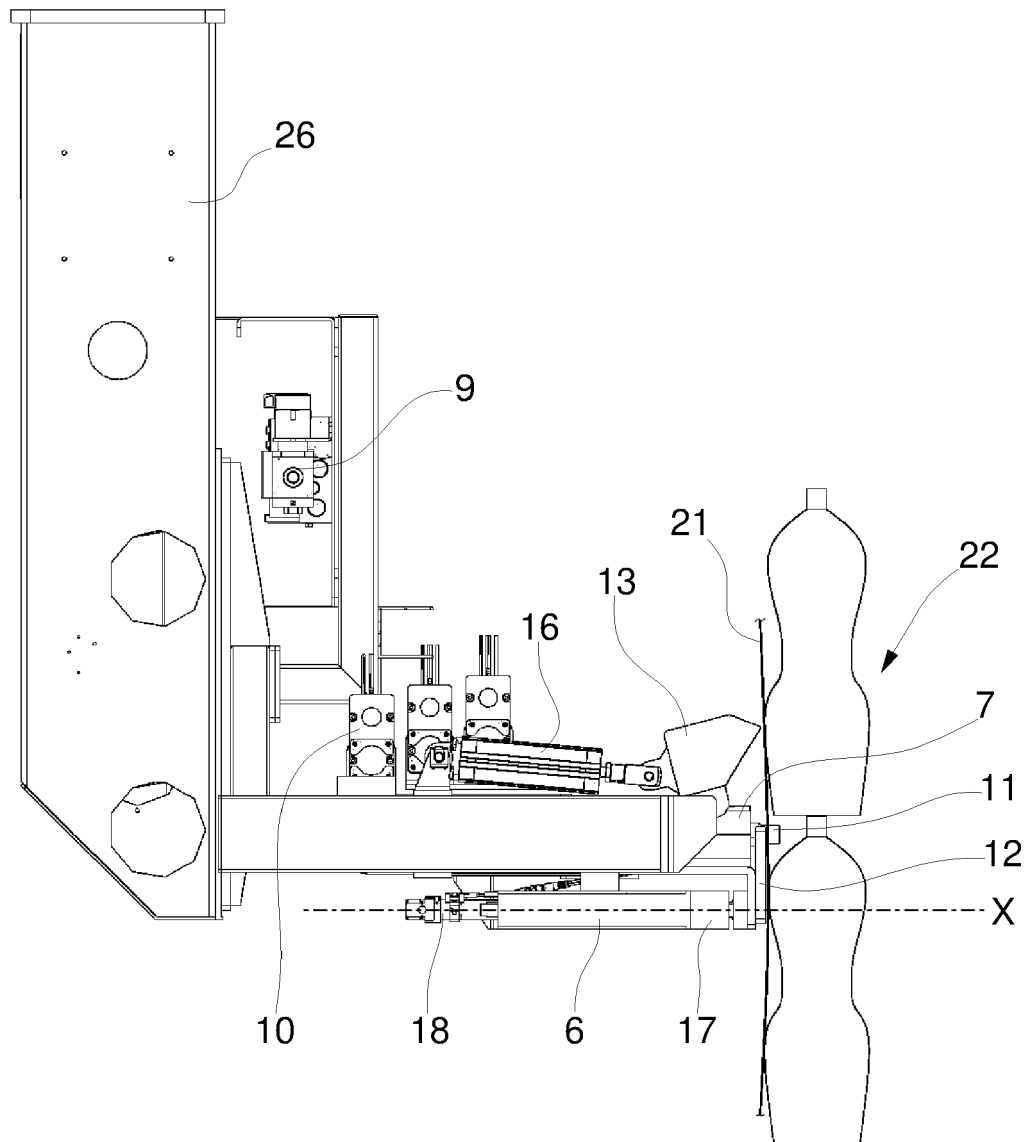


FIG. 4

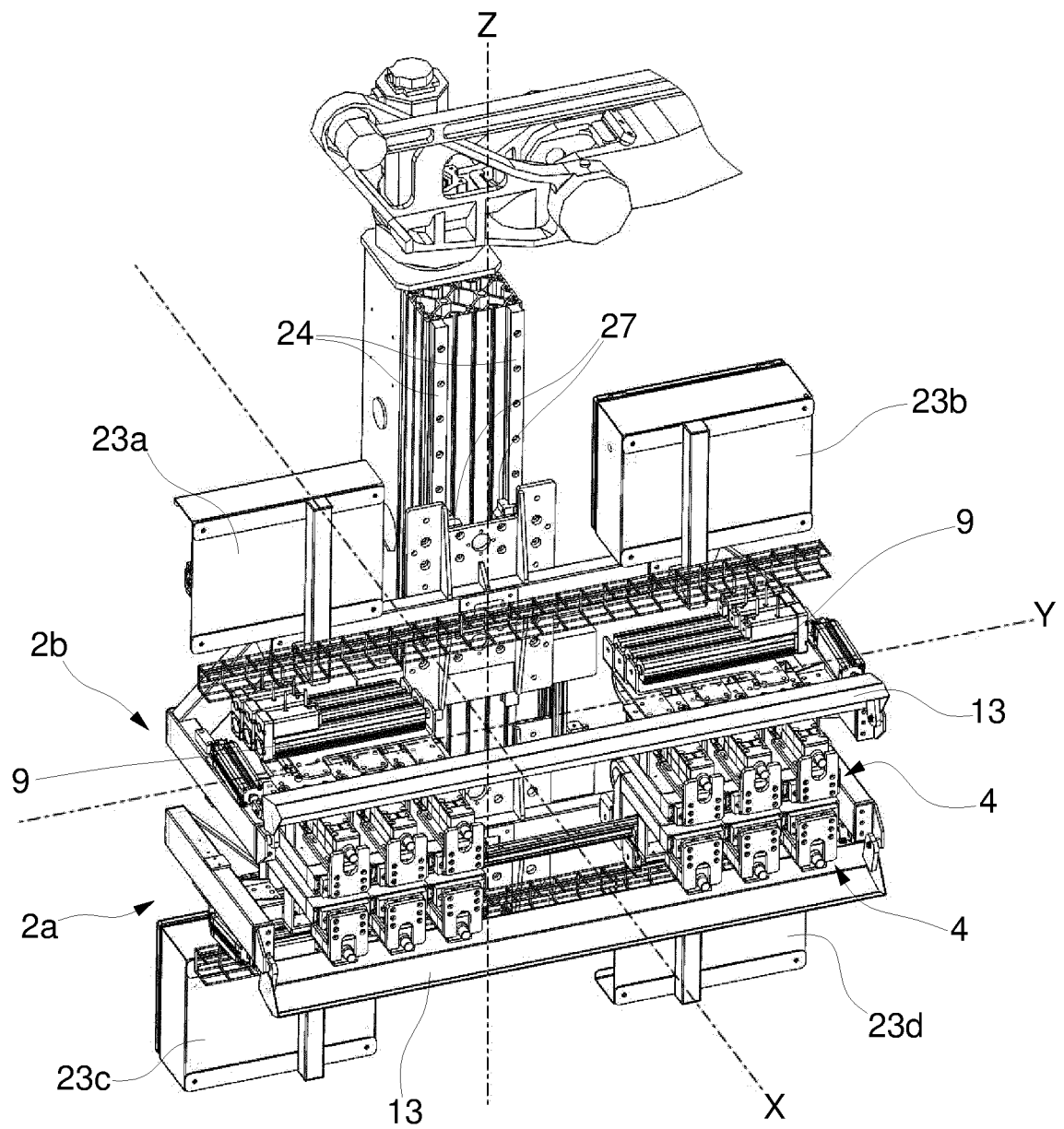


FIG. 5

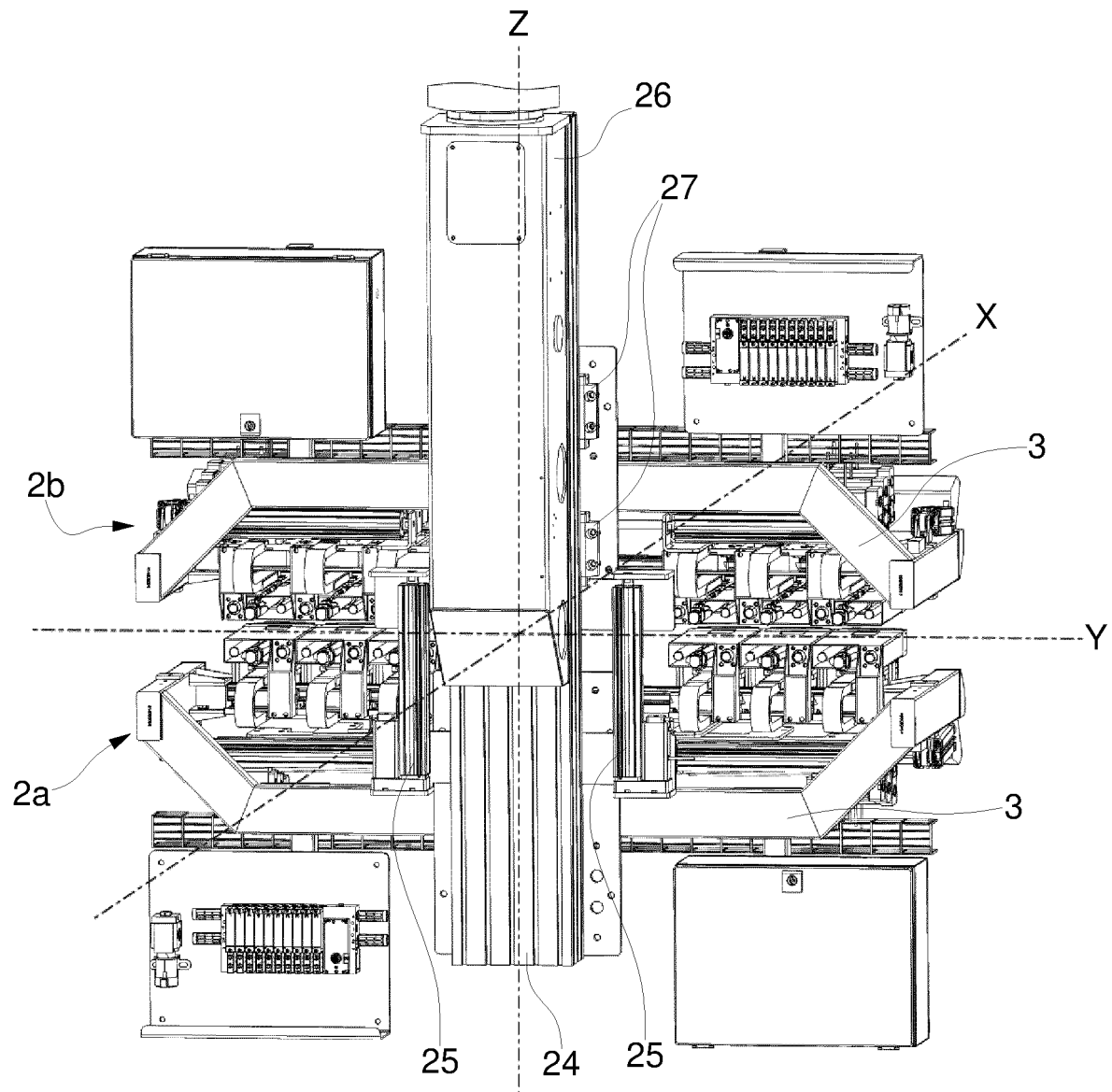


FIG. 6



EUROPEAN SEARCH REPORT

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 September 2021	Examiner Canelas, Rui
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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