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(54) **Method and apparatus for the production of panels made of wood or the like.**

(57) Method and machine for the production of panels (2) made of wood or similar, wherein a panel (2) made of wood is locked on a supporting plane (P1) at least in correspondence to a portion thereof (31), which is de-

tached from the panel (2), and is locked on the supporting plane (P1) to allow the panel (2) to be lifted and moved to a transferring plane (P2) arranged above said supporting plane (P1).

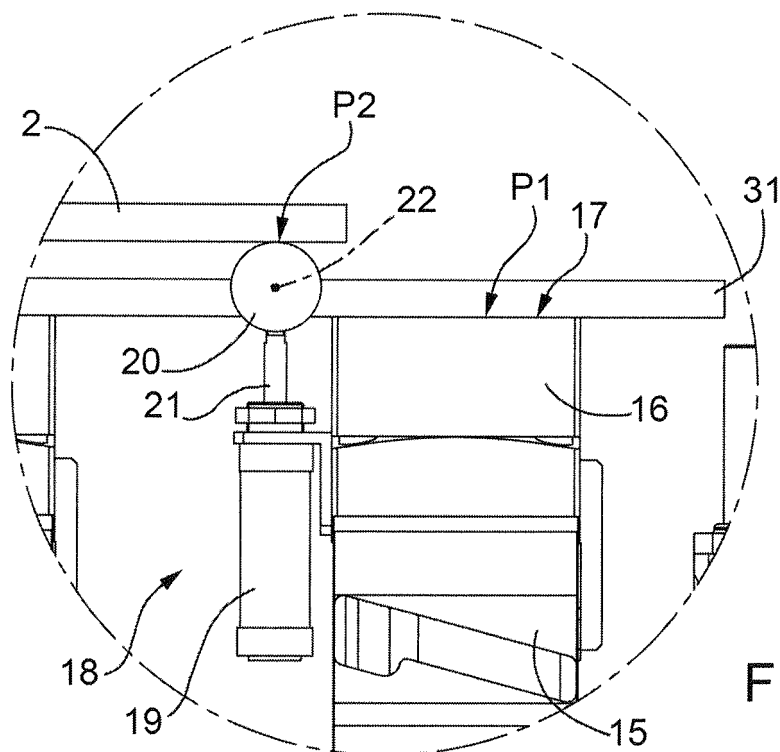


FIG.3

Description

[0001] The present invention relates to a method for the production of panels made of wood or the like.

[0002] In the sector of processing panels made of wood or the like, a prior art machine comprises an elongated base extending in a first given direction; a plurality of cross members mounted on the base parallel to a second direction crosswise to the first direction and mobile along the base in said first direction; a plurality of supporting blocks mounted on the cross members to define a supporting plane for at least one panel; and at least one working head for detaching a plurality of components from said panel.

[0003] Each supporting block comprises a sliding member that is mobile along the relative cross member in the second direction, and a supporting plate mounted on the output shaft of an actuating cylinder housed inside the sliding member and suitable to move the supporting plate between a lowered position, in which the supporting plate is coplanar to the supporting plane, and a raised position, in which the supporting plate projects above said supporting plane.

[0004] In use, each component is detached from the panel, and is then raised above the supporting plane by means of the relative supporting plates so as to undergo further finishing processes, such as drilling and/or milling and/or edge-trimming.

[0005] The prior art machines of the type described above have some drawbacks mainly deriving from the fact that the presence of an actuating cylinder for lifting each supporting plate and the insertion thereof inside the relative sliding member makes such machines relatively complex and expensive.

[0006] It is an object of the present invention to provide a method for the production of panels made of wood or the like that overcomes the drawbacks described above and that is simple and economical to produce.

[0007] According to the present invention there is provided a method for the production of panels made of wood or the like as claimed in claims 1 to 10.

[0008] The present invention also relates to a processing machine for panels made of wood or the like.

[0009] According to the present invention there is provided a processing machine for panels made of wood or the like as claimed in claims 11 to 23.

[0010] The present invention will now be described with reference to the accompanying drawings, illustrating a non-limiting embodiment thereof, in which:

figure 1 is a schematic perspective view of a preferred embodiment of the machine according to the present invention;

figure 2 is a schematic perspective view of a detail of the machine of figure 1 illustrated in a first operating position;

figure 3 is a schematic side view of the detail of figure 2 illustrated in a second operating position; and

figure 4 is a schematic perspective view of an alternative embodiment of the machine of figure 1.

[0011] With reference to figure 1, designated as a whole by number 1 is a processing machine for panels 2 made of wood or the like comprising an elongated base 3 extending in a horizontal direction 4, which is substantially U-shaped, and has two longitudinal guiding members 5 parallel to said direction 4.

[0012] The machine 1 also comprises a bridge crane 6, in turn comprising a vertical upright member 7, which is coupled to the base 3 in a conventional manner so as to perform, along said base 3 and driven by a conventional drive device that is not illustrated, rectilinear movements in the direction 4, and which supports a cross member 8 attached to a free end thereof and extending above the base 3 in a direction 9 horizontal and crosswise to the direction 4, and is limited laterally in said direction 4 by two faces 10, 11 arranged opposite one another.

[0013] The face 10 supports a conventional edge-trimming unit 12 connected in a conventional manner to the cross member 8 so as to move in the direction 9 and in a direction 13 that is vertical and orthogonal to the directions 4 and 9; and the face 11 supports a conventional working head 14, which is connected in a conventional manner to the cross member 8 so as to perform rectilinear movements along said cross member 8 in the direction 9, and comprises at least one tool-carrying spindle mounted in a conventional manner on the head 14 so as to move in the direction 13.

[0014] The machine 1 is also provided with a plurality of cross elements 15, which are referred to in the following description as "working planes", extending between the longitudinal members 5 and in the direction 9, and slidably coupled to said longitudinal members 5 so as to perform, with respect to the base 3, rectilinear movements in the direction 4.

[0015] The working planes 15 support a plurality of supporting blocks 16, each of which is coupled in a conventional manner to the relative working plane 15 so as to perform rectilinear movements along the relative working plane 15 in the direction 9, and is upperly limited by a substantially flat and horizontal face 17 that defines, with the upper faces 17 of the other blocks 16, a substantially horizontal supporting plane P1 and is selectively connectable to a conventional pneumatic suction device that is not illustrated.

[0016] Each block 16 supports a lifting device 18 comprising an actuating cylinder 19 fixed to the block 16 parallel to the direction 13, and a pair of supporting rollers 20 idly mounted on the free end of an output shaft 21 of the cylinder 19 so as to rotate about an axis 22 of rotation parallel to the direction 9. The rollers 20 are moved by the cylinder 19 between a lowered resting position (figure 2) in which the rollers 20 are coplanar to or lower than the plane P1, and a raised working position (figure 3), in which the rollers 20 define a supporting plane P2 parallel to and above said plane P1.

[0017] The machine 1 also comprises a feed unit 23 suitable to feed the panels 2 above the blocks 16 and comprising, in turn, a base 24, which is aligned with the base 3 in the direction 4, and supports a roller supporting device 25 and a grip and transfer unit 26.

[0018] The device 25 comprises a plurality of supporting bars 27 parallel to one another, which extend in the direction 4, and support relative pluralities of idle supporting rollers 28; and the unit 26 comprises a supporting bar 29, which extends in the direction 9, is mobile, with respect to the base 24, in the direction 4, and supports a plurality of gripping members 30, which are distributed along the bar 29 in the direction 9, are shaped so as to grip the panels 2 in correspondence with a rear edge thereof parallel to the direction 9, and are mobile in said direction 9 synchronously with one another during the processing of the panel 2 and independently of one another during a tooling step of the machine 1.

[0019] In the specific case, both the bars 27 of the device 25, and the bar 29 of the unit 26 are mobile, with respect to the base 24, in the direction 13 between a raised position, in which the rollers 28 and the plane P2 are substantially coplanar, and a lowered position, in which the rollers 28 and the plane P1 are substantially coplanar.

[0020] According to an embodiment that is not illustrated, the rollers 20 and 28 are eliminated and replaced, for instance, with ball bearings.

[0021] The operation of the machine 1 will now be described with reference to figures 1, 2 and 3 and starting from a moment in which the rollers 20, the rollers 28 and the members 30 are in their raised positions and in which the panel 2 is arranged on the rollers 28 and has been gripped by said members 30.

[0022] After the panel 2 has been moved by means of the bar 29 in the direction 4 to a given position above the blocks 16, the rollers 20, the rollers 28, and the members 30 are moved to their lowered positions to release the panel 2 onto the blocks 16, and the blocks 16 are connected to said pneumatic suction device (not illustrated) to lock the panel 2 on the plane P1.

[0023] The working head 14 then detaches a first component 31 from the panel 2 combining the movements of the bridge crane 6 in the direction 4 with the movements of the working head 14 in the direction 9; the component 31 is locked on the plane P1; the rollers 20 not engaged by the component 31, the rollers 28, and the members 30 are then moved back into their raised positions to lift the panel 2 to the plane P2; and the work cycle described above is repeated to detach a first set of components 31 from the panel 2, said set of components 31 being aligned with one another in the direction 4, arranged at a fixed distance from one another, and then undergoing further finishing processes, e.g. edge-trimming performed by the edge-trimming unit 12 and/or milling and/or drilling performed by the working head 14.

[0024] Lastly, when the components 31 of said first set of components 31 have been processed and unloaded

from the machine 1, the panel 2 is moved in the directions 4 and/or 9 so that the work cycle described above can be repeated and a second set of components 31 can be detached and finished.

[0025] According to an alternative embodiment that is not illustrated, the bridge crane 6 is fixed in the direction 4, the edge-trimming unit 12 and the working head 14 are fixed in the direction 9, and the components 31 are detached from the panel 2 and undergo further processing by combining the movements of the working planes 15 and of the gripping members 30 in the direction 4 with the movements of the supporting blocks 16 and of the gripping members 30 in the direction 9.

[0026] With regard to the above description, it should be noted that:

the way in which the supporting blocks 16 are arranged on the relative working planes 15 substantially depends on the shape and/or dimensions of the panels 2 and of the components 31;

the panel 2 is moved to the plane P2 so that the peripheral edge of each component 31 as it is detached from said panel 2 is disengaged from the adjacent components 31;

by lifting the panels 2 from the plane P1 to the plane P2, components 31 of any shape can be cut;

the panel 2 can only be locked on the plane P1 in correspondence with each component 31 as it is detached from said panel 2;

in the case of components 31 with undercuts, the plane P2 must be arranged at a distance from the plane P1 calculated as the rounded-up approximation of the thickness of the panel 2;

the supporting blocks 16 are selectively connected to said pneumatic suction device (not illustrated) and the rollers 20 are selectively moved between the relative raised positions and the relative lowered positions according to the shape and/or dimensions of the panels 2 and of the components 31; and

the machine 1 is provided with a conventional labelling device so as to label the panel 2 in correspondence with each component 31.

[0027] The alternative embodiment illustrated in figure 4 only differs from that illustrated in the previous figures in that the roller supporting device 25 has been eliminated, the panels 2 are picked up from a stack 33 of panels 2, and as each panel 2 comes to the top of the stack 33 it is first moved on the stack 33 and along the plane P2 to disengage said stack 33 and then lowered from the plane P2 to the plane P1 in order to cut the components 31.

[0028] According to an alternative embodiment that is not illustrated, the panels 2 are fed above the blocks 16 in the direction 9.

[0029] The pattern of cutting the components 31 from the panel 2 can clearly differ from that described and illustrated in figures 1 and 4.

Claims

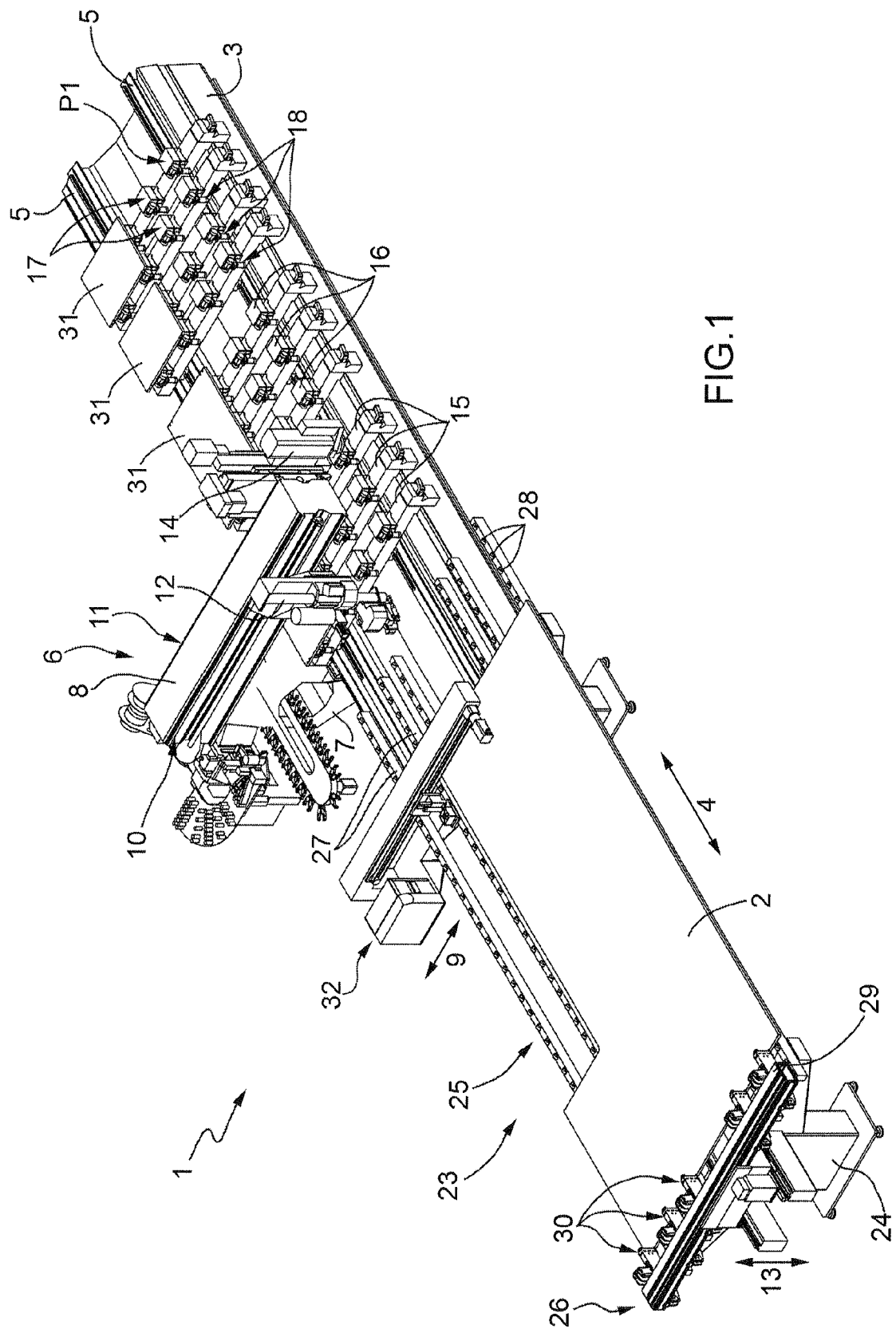
1. Method for the production of panels (2) made of wood or the like, comprising the following steps:
 - arranging the panel (2) on a supporting plane (P1);
 - locking the panel (2) on the supporting plane (P1) at least in correspondence to a component (31) to be detached from said panel (2); and
 - detaching the component (31) from the panel (2);
 - and **characterized in that** it further comprises the following steps:
 - keeping the component (31) locked on the supporting plane (P1);
 - lifting the panel (2) to a transferring plane (P2) located above the supporting plane (P1); and
 - moving the panel (2) along the transferring plane (P2).
2. Method according to claim 1, further comprising the following step:
 - lowering the panel (2) from the transferring plane (P2) to the supporting plane (P1) before detaching the component (31) from said panel (2).
3. Method according to claim 1 or 2, wherein the supporting and transferring planes (P1, P2) are substantially parallel to each other.
4. Method according to one of the preceding claims, further comprising the following step:
 - moving the panel (2) parallel to the supporting and transferring planes (P1, P2) in a first and/or second direction (4, 9), substantially orthogonal to each other
5. Method according to claim 4, further comprising the following steps:
 - successively detaching a plurality of components (31) from the panel (2);
 - moving the panel (2) in said first and/or second direction (4, 9) to disengage a peripheral edge of each component (31) from the adjacent components (31).
6. Method according to one of the preceding claims, wherein the supporting plane (P1) is defined by a plurality of supporting blocks (16), each of them being upperly limited by a respective flat face (17) connectable to a pneumatic suction device; said method further comprising the following step:
 - selectively connecting the upper faces (17) of the supporting blocks (16) to the pneumatic suction device according to the shape and/or dimensions of the panel (2) and/or the component (31).
7. Method according to one of the preceding claims, further comprising the following steps:
 - selectively moving a plurality of lifting devices (18) of the panel (2) between relative raised working positions, wherein the lifting devices (18) are substantially coplanar to the transferring plane (P2), and relative lowered resting positions, wherein the lifting devices (18) are coplanar to, or lower than, the supporting plane (P1), according to the shape and/or the dimensions of the panel (2) and/or of the component (31).
8. Method according to any one of the preceding claims, further comprising the following step:
 - removing the panel (2) from a stack (33) of panels (2).
9. Method according to one of the preceding claims, further comprising the following step:
 - drilling and/or milling and/or edge-trimming each component (31).
10. Method according to one of the preceding claims, further comprising the following step:
 - labelling the panel (2) in correspondence to each component (31).
11. Processing machine for panels (2) made of wood or the like, comprising supporting means (16) defining a substantially horizontal supporting plane (P1) for at least a panel (2); at least a working head (14) for detaching at least a component (31) from the panel (2); and locking means (16) for locking the panel (2) on the supporting plane (P1), at least in correspondence to the component (31); and **characterized in that** it further comprises lifting means (18, 25, 26) for moving the panel (2) from the supporting plane (P1) to a transferring plane (P2) located above the supporting plane (P1).
12. Machine according to claim 11, wherein the supporting and transferring planes (P1, P2) are substantially parallel to each other.
13. Machine according to claim 11 or 12, wherein the lifting means (18, 25, 26) comprise a grip and transfer unit (26) of the panel (2) mobile parallel to the supporting and transferring planes (P1, P2) in a first

and/or a second direction (4, 9), substantially orthogonal to each other.

14. Machine according to claim 13, wherein the grip and transfer unit (26) is mobile in a third direction (13) orthogonal to the supporting and transferring planes (P1, P2). 5
15. Machine according to one of claims 11-14, wherein the lifting means (18, 25, 26) further comprise a plurality of lifting means (18) of the panel (2) selectively mobile between relative raised working positions, wherein the lifting devices (18) are substantially coplanar to the transferring plane (P2), and relative lowered resting positions, wherein the lifting devices (18) are coplanar to, or below the supporting plane (P1) according to the shape and/or the dimensions of the panel (2) and/or of the component (31). 10 15
16. Machine according to claim 15, wherein each lifting device is provided with relative rolling means (20) of the panel (2) on the transferring plane (P2). 20
17. Machine according to one of the claims 11-16, wherein the supporting means (16) comprise a plurality of supporting blocks (16) upperly limited by respective flat faces (17), which define the supporting plane (P1), and which are selectively connectable to a pneumatic suction device according to the shape and/or the dimensions of the panel (2) and/or the component (31). 25 30
18. Machine according to claim 17 when it is dependent on claim 15, wherein each said lifting device (18) is supported by a relative said supporting block (16). 35
19. Machine according to claim 17 or 18, wherein the supporting blocks (16) are mobile parallel to the supporting and transferring planes (P1, P2) in a first and/or a second direction (4, 9) substantially orthogonal to each other. 40
20. Machine according to claim 19, further comprising a base (3) extending in the first direction (4); and a plurality of cross elements (15), which are mounted on the base (3), parallel to the second direction (9), are mobile along the base (3) in the first direction (4) and each of which supports at least a relative said supporting block (16) mobile along the cross element (15) in said second direction (9). 45 50
21. Machine according to one of claims 11-20, wherein the working head (14) is mobile, parallel to the supporting and transferring planes (P1, P2) in a first and/or a second direction (4, 9), substantially orthogonal to each other. 55
22. Machine according to one of claims 11-21, further

comprising drilling and/or milling and/or edge-trimming means for the components (31).

23. Machine according to one of claims 11-22, further comprising a labelling device (32) for labelling the panel (2) in correspondence to each component (31).



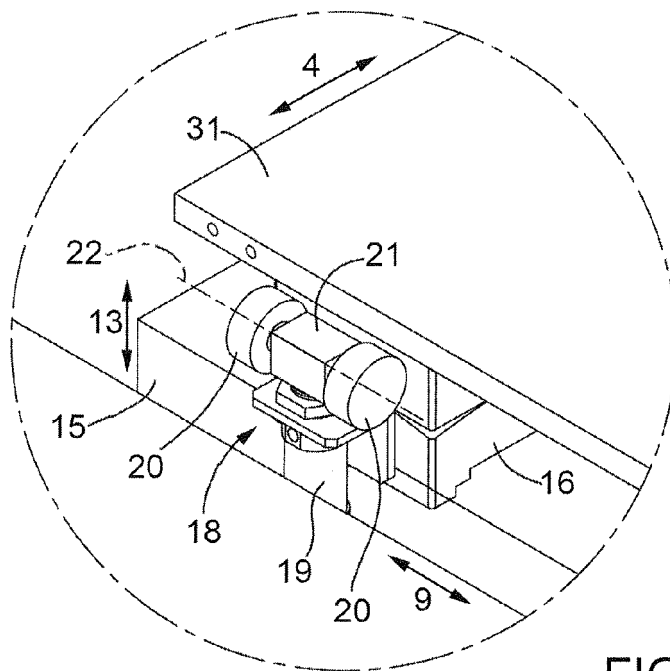


FIG. 2

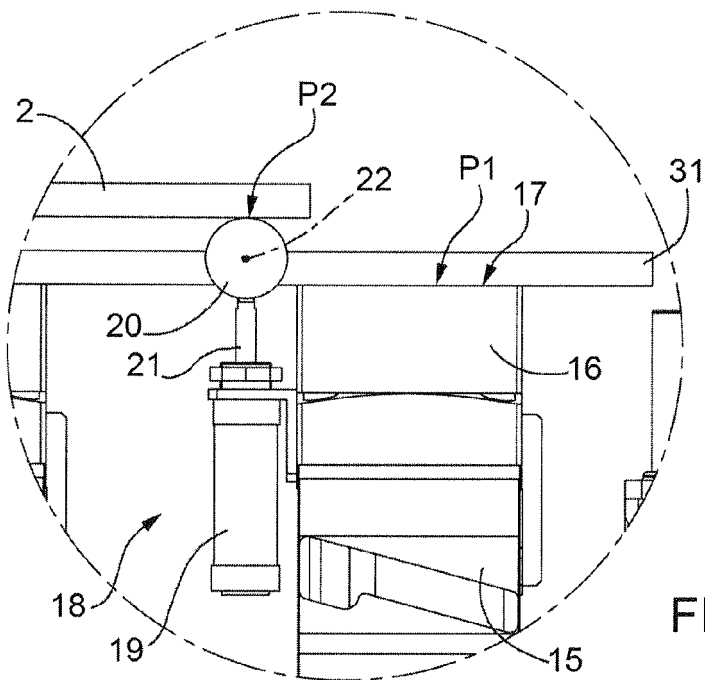


FIG. 3

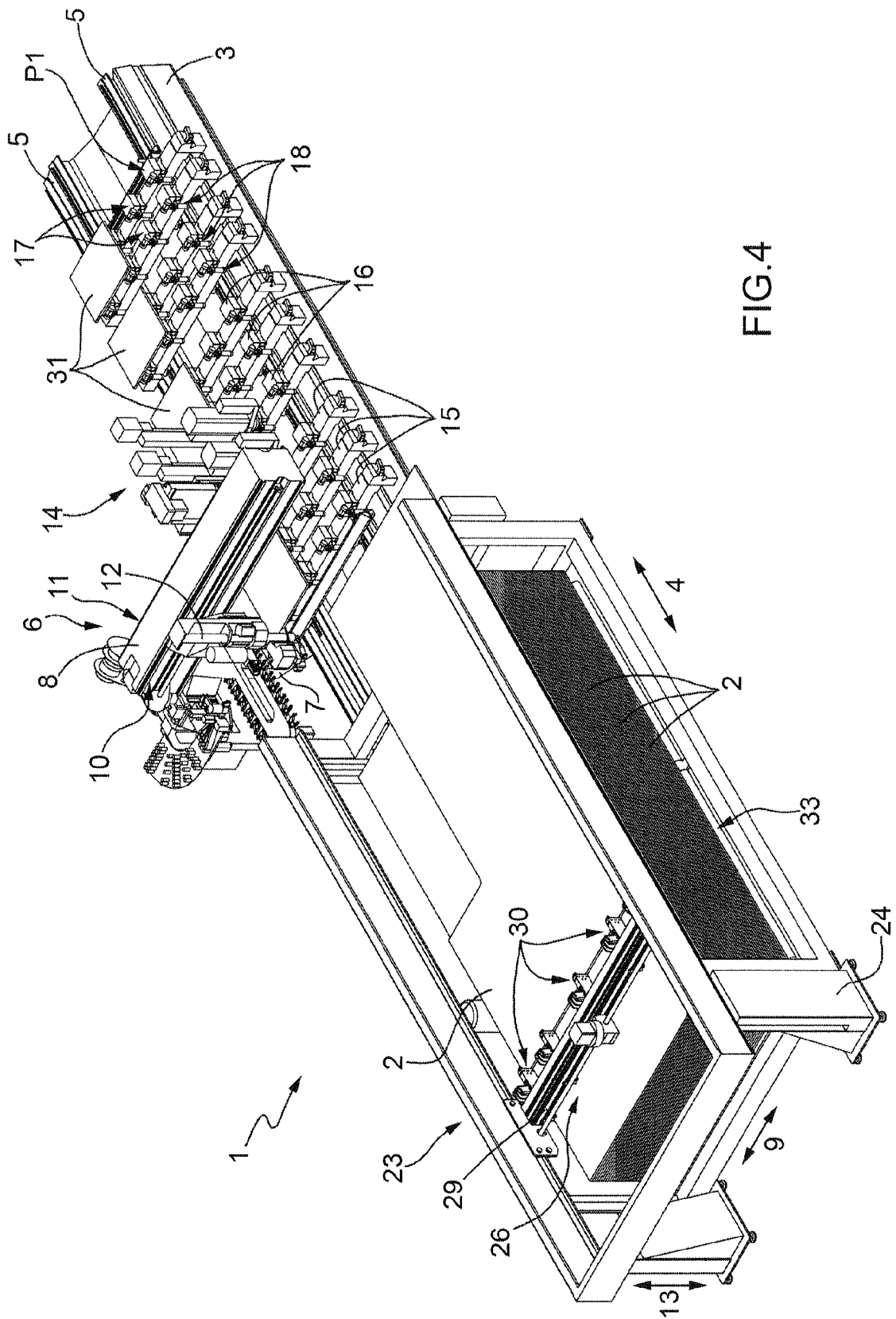


FIG. 4.



EUROPEAN SEARCH REPORT

Application Number
EP 09 16 7512

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			TECHNICAL FIELDS SEARCHED (IPC)
			B27M
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 November 2009	Examiner Garella, Mario
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 16 7512

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