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(71) Applicant: **BIESSE S.p.A.**
61100 Pesaro (IT)

(72) Inventor: **Bernardi, Paolo**
47841 Cattolica (IT)

(74) Representative: **Jorio, Paolo et al**
STUDIO TORTA
Via Viotti 9
10121 Torino (IT)

(54) **Machine and method for work wood or similar material**

(57) A method and machine for machining wood components (2) or the like, wherein each component (2) is locked within corresponding clamping vices (19) mounted over an elongated base (3), is machined by means of at least one operating head (12) carried by a bridge-crane (8) displaceable along the base (3) itself, and is taken from the clamping vices (19) and/or fed to the clamping vices (19) by means of at least one grip and transport unit (24) displaceable along an elongated cavity (7), which is obtained in the base (3) and opens outwards at an upper surface (5) of the base (3) itself.

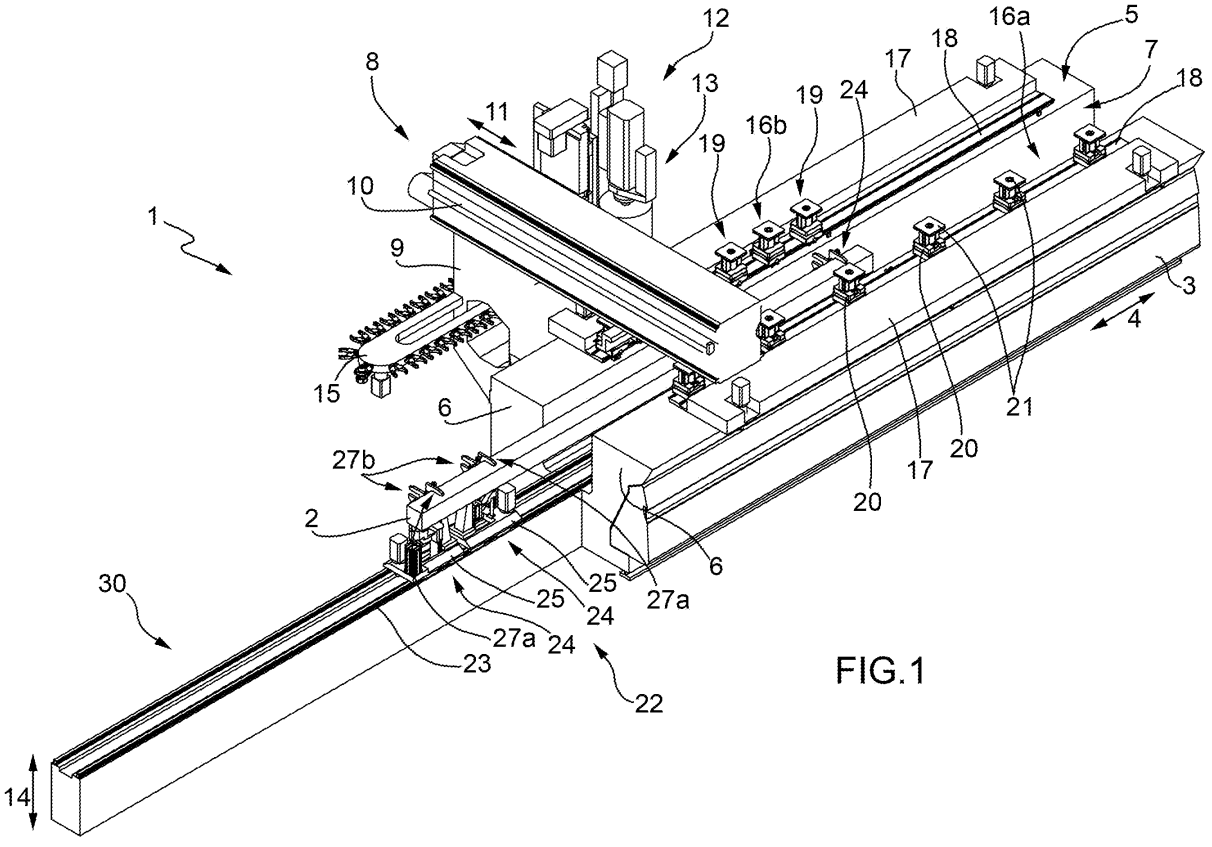


FIG.1

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Description

[0001] The present invention relates to a machine for machining wood components or the like, in particular elongated components for fixtures.

[0002] Hereinafter, the term "fixture" will be used to identify doors, windows and furniture doors comprising a closing plate or sheet, e.g. made of glass, mounted within an annular supporting frame, normally defined by a plurality of wood components or the like connected to one another.

[0003] In the field of machining wood components or the like, it is known to provide a machine of the type comprising an elongated base provided with two longitudinal guiding elements parallel to a substantially horizontal first direction; a plurality of crosspieces mounted between the longitudinal guiding elements parallelly to a substantially horizontal second direction which is transversal to the first direction; at least one clamping vice mounted to each crosspiece to lock at least one component; and a bridge-crane, which extends over the base in the second direction, is provided with at least one operating head, and is displaceable along the base in the first direction.

[0004] There are two types of methods generally used by the known machines of the above-described type for transferring the components into the corresponding clamping vices and for taking the components from the corresponding clamping vices.

[0005] According to a first method, the components are manually transferred to the corresponding clamping vices and taken from the corresponding clamping vices by an operator, with consequent relatively long machine preparation times.

[0006] According to other of the two methods described above, the components are transferred to the corresponding clamping vices and taken from the corresponding clamping vices by a grip and transport device carried by the bridge-crane or associated with the machine and adapted to displace the components over the base and between the clamping vices. In both cases, the actuation of the grip and transport device implies stopping the operating head and, therefore, relatively long production cycles of the machine.

[0007] It is an object of the present invention to provide a machine for machining wood components or the like which is free from the above-described drawbacks and which is simple and cost-effective to be implemented.

[0008] According to the present invention, a machine for machining wood components or the like is provided as claimed in the claims from 1 to 10.

[0009] The present invention further relates to a method for machining wood components or the like.

[0010] According to the present invention, a method for machining wood components or the like is provided as claimed in the claims from 11 to 16.

[0011] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limitative embodiment thereof, in which:

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

figure 2 is a schematic side view of the machine in figure 1.

[0012] With reference to figures 1 and 2, numeral 1 indicates as a whole a machine for machining wood components 2 or the like, in particular components 2 for fixtures, having an elongated shape.

[0013] Machine 1 comprises an elongated base 3, which extends in a horizontal direction 4, is substantially U-shaped, is delimited by a substantially horizontal upper surface 5, and has two longitudinal elements 6, which extend in direction 4, and are separated from each other by an elongated cavity 7, which is obtained through the base 3 in direction 4, opens outwards at surface 5, and is longitudinally open at the ends thereof in the direction 4 itself.

[0014] Base 3 supports a bridge-crane 8 comprising, in turn, a vertical upright 9 which is coupled to base 3 in a known manner to perform rectilinear movements in direction 4, along the base 3 itself under the bias of a known actuating device (not shown), and carries a crosspiece 8 connected to a free end thereof, which crosspiece extends over the base 3 in a horizontal direction 11 transversal to direction 4.

[0015] The bridge-crane 8 supports an operating head 12 of known type, which is coupled to the crosspiece 10 in a known manner to perform rectilinear movements in the direction 11 along the crosspiece 10 itself, and comprises at least one electrospindle 13 mounted to the head 12 in a known manner to move in a vertical direction 14 orthogonal to directions 4 and 11. The electrospindle 13 is adapted to receive and hold a machining tool or aggregate, which is shaped to perform, for example, milling and/or drilling operations on the components 2, and is adapted to be transferred between the electrospindle 13 and a closed-loop tool stock 15 through the upright 9.

[0016] Machine 1 is further provided with two clamping groups 16a, 16b, each of which is mounted to a corresponding longitudinal element 6, and comprises a supporting plate 17 of elongated rectangular shape, which extends in direction 4, is coupled to the corresponding longitudinal element 6 in a known manner to perform rectilinear movements in direction 11, with respect to the corresponding longitudinal element 6 itself, and supports a rectilinear guide 18 parallel to direction 4 and facing the guide 18 of the other clamping group 16a, 16b.

[0017] A plurality of clamping vices 19 are mounted to the guide 18, each of which comprises a lower jaw 20 slidingly coupled to the guide 18 to perform rectilinear movements in direction 4, with respect to the plate 17, and an upper jaw 21 displaceable in direction 14 between a clamping position and a releasing position of at least one component 2.

[0018] The vices 19 of each clamping group 16a, 16b define a substantially horizontal resting plane P1 copla-

nar to the plane P1 defined by the vices 19 of the other clamping group 16a, 16b, and are arranged along the corresponding guide 18 substantially according to the dimensions of components 2 to be machined and/or to the machining operations to be performed on the components 2.

[0019] Machine 1 further comprises a feeding device 22 adapted, in this case, to transfer the components 2 to be machined to the vices 19 and to take the machined components 2 from the vices 19.

[0020] Device 22 comprises a guide 23, which extends over a bottom wall of the cavity 7 in direction 4, protrudes outwards from the cavity 7 in the direction 4 itself, and supports a plurality of grip and transport units 24 (three units 24 in this case).

[0021] Each unit 24 comprises a first slide 25 slidingly coupled to the guide 23 to perform rectilinear movements in direction 4 with respect to the base 3, and a second slide 26 coupled to the slide 25 in a known manner to perform rectilinear movements in direction 14 with respect to the slide 25.

[0022] Slide 26 supports a pair of grip and transport members 27a, 27b opposite to each other, each of which faces the vices 19 of a corresponding clamping group 16a, 16b, and comprises a lower jaw 28 fixed to the slide 26 and an upper jaw 29 displaceable in direction 14 between a clamping position and a releasing position of at least one component 2.

[0023] The members 27a, 27b of the units 24 define respective substantially horizontal resting planes P2 parallel to the planes P1, and are displaced by the respective slides 26 between a lifted position, in which the planes P2 are substantially coplanar to the planes P1, and a lowered position in which the planes P2 extend under the planes P1.

[0024] The operation of machine 1 will now be described with reference to figures 1 and 2 and starting from a moment when at least one component 2 to be machined is loaded, in this case into the members 27a of the grip and transport units 24 in a feeding station 30 obtained at the portion of guide 23 outside the cavity 7.

[0025] The considered component 2 is firstly fed by the members 27a, arranged in their lowered positions, along the cavity 7 in direction 4, is then lifted by the slide 26 to the level of planes P1 and taken by the vices 19 of the clamping group 16a, and is finally machined by the operating head 12 at one longitudinal face thereof orthogonal to direction 11 and possibly at its head faces orthogonal to direction 4.

[0026] Once the mentioned first longitudinal face has been machined, the component 2 is firstly transferred from the vices 19 of group 16a to the vices 19 of group 16b, is then machined by the operating head 12 at a second longitudinal face thereof opposite to the first longitudinal face, and is finally transferred from the vices 19 of group 16b to the members 27b.

[0027] The newly machined component 2 is then transferred from the units 24 to the feeding station 30 and downloaded from the members 27b.

[0028] As regards the above description, it is worth specifying that:

- the transfers of the components 2 between the units 24 and the vices 19 of groups 16a, 16b and between the vices 19 of group 16a and the vices 19 of group 16b are performed by moving the groups 16a, 16b in direction 11 between the corresponding forward positions and the corresponding retracted positions; and
- the units 24 are free to take a new component 2 in the feeding station 30 once the considered component 2 has been transferred to the vices 19 of group 16a, and to transfer the new component 2 to the vices 19 of group 16a once the considered component 2 has been transferred from the vices 19 of group 16a to the vices 19 of group 16b.

[0029] Machine 1 has some advantages mainly deriving from that the transfer of the components 2 between the grip and transport units 24 and the vices 19 of the clamping groups 16a, 16b does not prevent the operating head 12 from machining the components 2 thus ensuring relatively short production cycles.

Claims

1. A machine for machining wood components (2) or the like, the machine comprising an elongated base (3) which extends in a given first direction (4), is delimited by a substantially horizontal upper surface (5), and has an elongated cavity (7) which extends in the first direction (4) and opens outwards at the upper surface (5) itself; a bridge-crane (8) which extends over the base (3) in a second direction (11) substantially transversal to the first direction (4), is provided with at least one operating head (12), and is displaceable along the base (3) in the first direction (4) itself; a plurality of clamping vices (19) mounted over the upper surface (5) to hold at least one component (2) to be machined; and a feeding device (22) to take each component (2) from the corresponding clamping vices (19) and/or feed each component (2) to the corresponding clamping vices (19), the feeding device (22) comprising at least one grip and transporting unit (24); and being **characterized in that** each grip and transport unit (24) comprises a first slide (25) displaceable along the cavity (7) in the first direction (4), and at least one grip and transport member (27a, 27b) carried by the first slide (25) itself.

2. A machine according to claim 1, wherein the cavity (7) is longitudinally open in the first direction (4) at least at one of its ends; the feeding device (22) comprising a guide (23) which is slidingly engaged by the grip and transport unit (24), extends along the

cavity (7) in the first direction (4), and projects outwards from the base (3) in the first direction (4) itself.

3. A machine according to claim 1 or 2, wherein the clamping vices (19) are divided in at least two groups (16a, 16b) of clamping vices (19) mounted to the base (3) on opposite sides of the cavity (7) in the second direction (11).

4. A machine according to claim 3, wherein the clamping vices (19) of each group (16a, 16b) of clamping vices (19) are displaceable with respect to the base (3) in the second direction (11).

5. A machine according to claim 3 or 4, wherein the clamping vices (19) of each group (16a, 16b) of clamping vices (19) are aligned one with the other in the first direction (4) and are displaceable one with respect to the other in the first direction (4) itself.

6. A machine according to any one of the preceding claims, wherein each grip and transport unit (24) further comprises at least one second slide (26) mounted to the first slide (25) in order to move in a third direction (14) substantially orthogonal to said first and second directions (4, 11); the grip and transport member (27a, 27b) being mounted to the second slide (26) itself.

7. A machine according to any one of the preceding claims, wherein each grip and transport unit (24) comprises two of said grip and transport members (27a, 27b) opposite to each other.

8. A machine according to claim 7, wherein the clamping vices (19) are divided in at least two groups (16a, 16b) of clamping vices (19) mounted to the base (3) on opposite sides of the cavity (7) in the second direction (11); each grip and transport member (27a, 27b) facing the clamping vices (19) of a corresponding group (16a, 16b) of clamping vices (19).

9. A machine according to any one of the preceding claims, wherein the feeding device (22) comprises at least one feeding station (30) arranged outside said cavity (7) to allow the grip and transport units (24) to take and/or release the components (2).

10. A machine according to any one of the preceding claims, wherein the clamping vices (19) and the grip and transport units (24) define first and second resting planes (P1, P2), respectively, for at least one component (2); the grip and transport units (24) being configured to displace the second resting plane (P2) between a lifted position, in which the first and second resting planes (P1, P2) are substantially coplanar to each other, and a lowered position in which the second resting plane (P2) is arranged under the first resting plane (P1).

11. A method for machining wood components (2) or the like in a machine comprising an elongated base (3), which extends in a given first direction (4), is delimited by a substantially horizontal upper surface (5), and has an elongated cavity (7) which extends in the first direction (4) and opens outwards at said upper surface (5); a bridge-crane (8) which extends over the base (3) in a second direction (11) substantially transversal to the first direction (4), is provided with at least one operating head (12), and is displaceable along the base (3) in the first direction (4) itself; and a plurality of clamping vices (19) mounted over the upper surface (5) to hold at least one component (2) to be machined; the method comprising the step(s) of:

taking each component (2) from the corresponding clamping vices (19) and/or feeding each component (2) to the corresponding clamping vices (19) by means of at least one grip and transport unit (24);
and being **characterized in that** each grip and transport unit (24) comprises at least one grip and transport member (27a, 27b), the method further comprising the step of:
displacing the grip and transport member (27a, 27b) along the cavity (7) in the first direction (4).

12. A method according to claim 11, wherein the cavity (7) is longitudinally open in the first direction (4) at least at one of its ends; the method further comprising the step of:

displacing the grip and transport member (27a, 27b) outwards from the cavity (7) in the first direction (4).

13. A method according to claim 11 or 12 and further comprising the steps of:

displacing each clamping vice (19) in the second direction (11), and
displacing each grip and transport member (27a, 27b) in a third direction (14) substantially orthogonal to said first and second directions (4, 11).

14. A method according to claim 13, wherein the clamping vices (19) and the grip and transport members (27a, 27b) define first and second resting planes (P1, P2), respectively, for at least one component (2); the method further comprising the step of:

displacing the grip and transport members (27a, 27b) in the third direction (14) between a lifted position, in which the two resting planes (P1, P2)

are substantially coplanar to each other, and a lowered position, in which the second resting plane (P2) is arranged under the first resting plane (P1).

15. A method according to any one of the claims from 11 to 14, wherein the clamping vices (19) are divided in at least two groups (16a, 16b) of clamping vices (19) mounted to the base (3) on opposite sides of the cavity (7) in the second direction (11), and wherein each grip and transport unit (24) comprises first and second grip and transport members (27a, 27b) opposite to each other; the method further comprising the steps of:

feeding the component (2) to be machined to the clamping vices (19) of a first said group (16a) of clamping vices (19) by means of the first grip and transport member (27a);
transferring the component (2) from the clamping vices (19) of the first group (16a) of clamping vices (19) to the clamping vices (19) of a second said group (16b) of clamping vices (19); and
taking the newly machined component (2) from the clamping vices (19) of the second group (16b) of clamping vices (19) by means of the second grip and transport member (27a).

16. A method according to any one of the claims from 11 to 15 and further comprising the step(s) of:

feeding the components (2) to be machined to the grip and transport units (24) and/or taking the machined components (2) from the grip and transport units (24) at least at one feeding station (30) arranged outside said cavity (7).

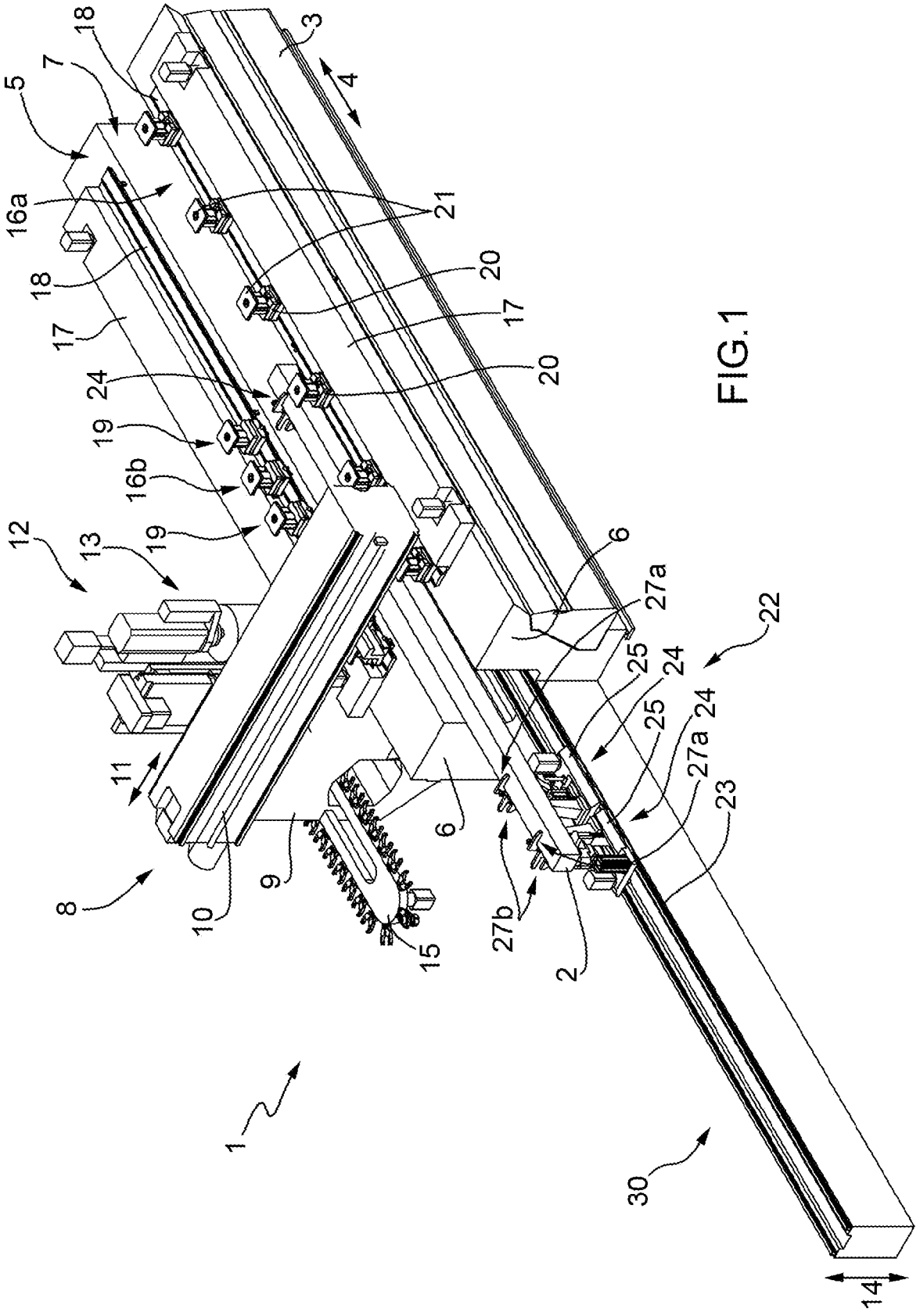

18
7
5
3
4
16a
21
18
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17
17
24
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19
16b
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27a
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27a
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15
27b
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30
14

FIG.1

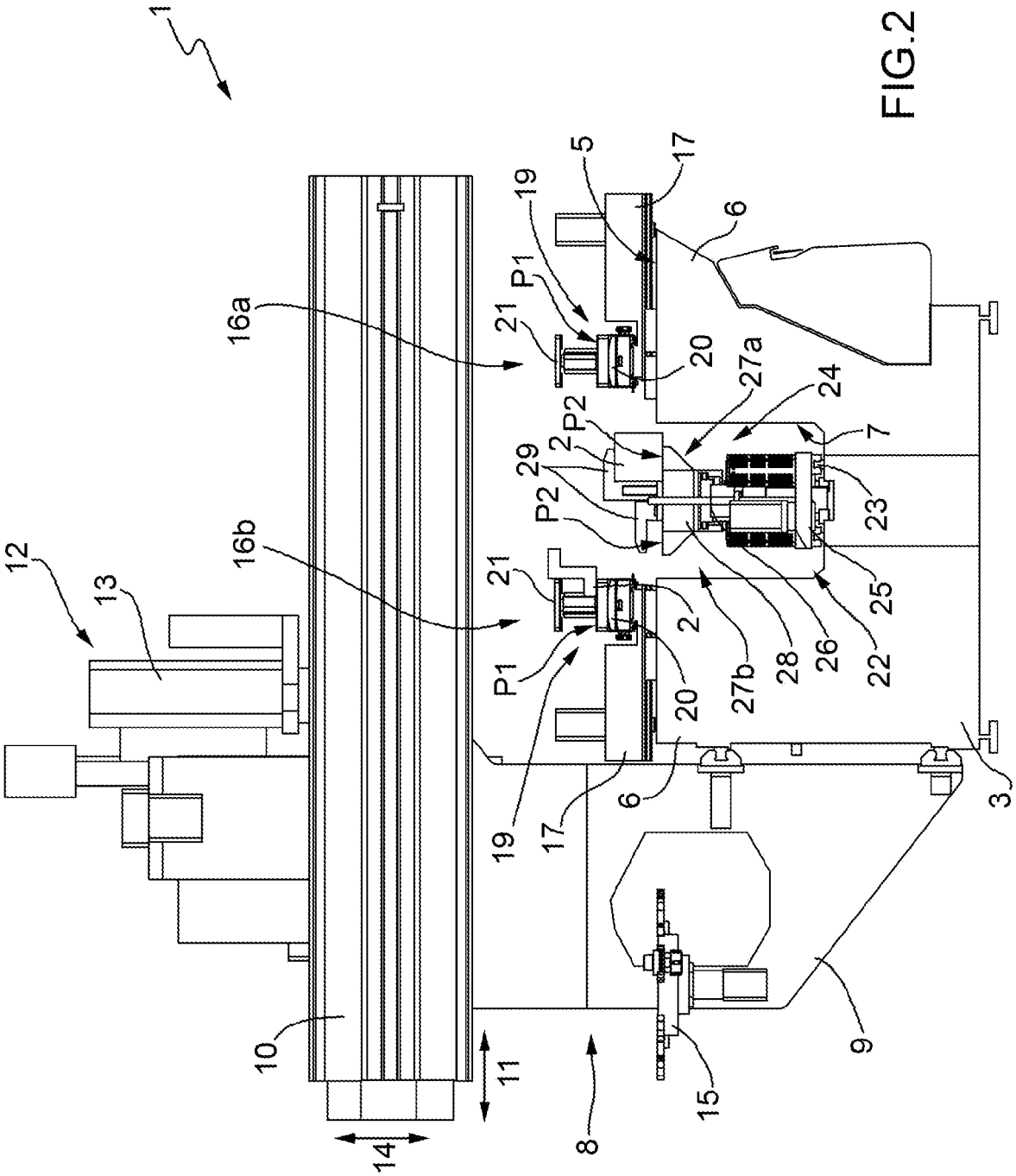

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17
19
6
P1
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16a
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27a
24
P2
2
7
29
23
P2
25
12
13
16b
21
2
27b
28
26
22
P1
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17
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11
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15
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14

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
EP 10 15 1581

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 May 2010	Hamel, Pascal

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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