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(54) **Planing machine for planing components made of wood or similar.**

(57) A planing machine for planing components (2) made of wood or the like is provided with a feeding device (5) apt to feed a component (2) through a planing station (22) having two planing devices (25) for the upper and

lower faces (2a, 2b) of the component (2) itself; the feeding device (5) having two grip and transfer elements (18) apt to exclusively engage the component (2) at a side profile (3) thereof extending between the upper and lower faces (2a, 2b) thereof.

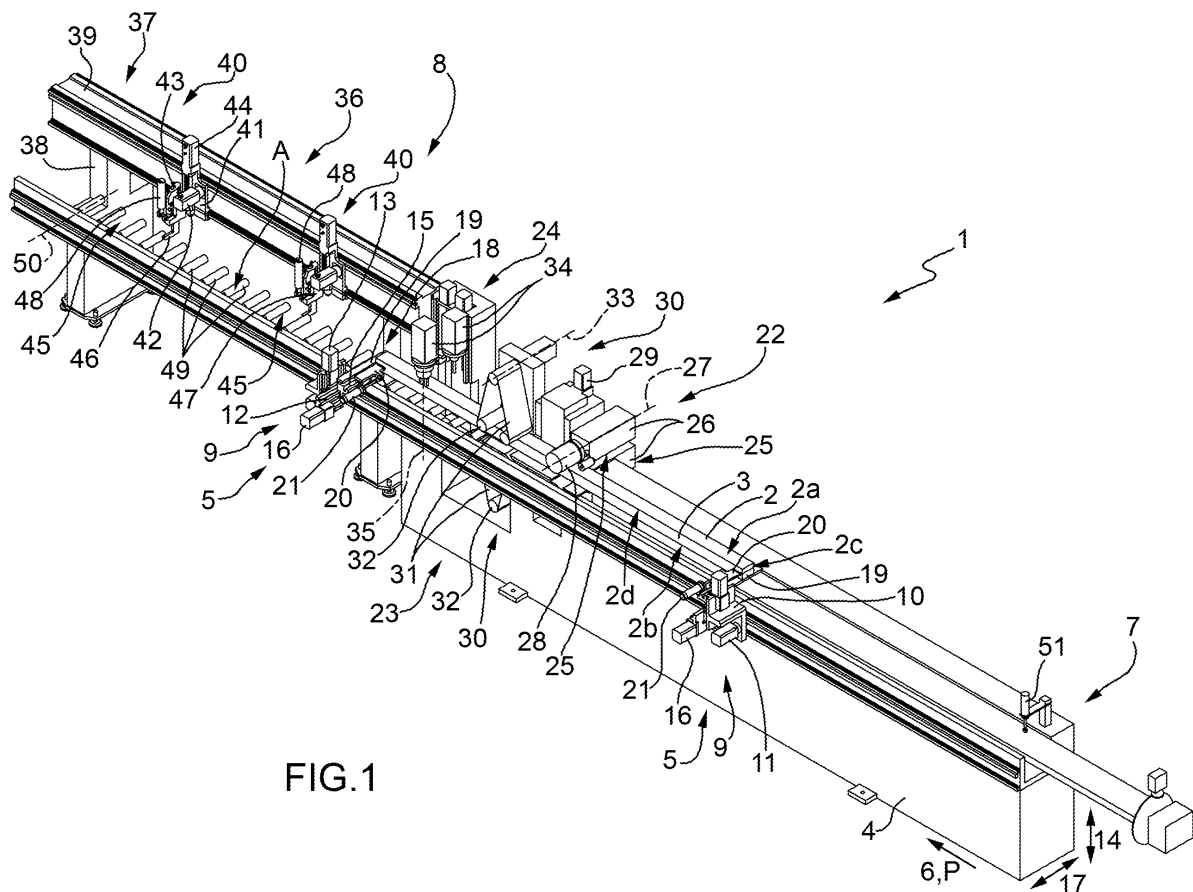


FIG. 1

Description

[0001] The present invention relates to a planing machine for planing components made of wood and the like, in particular elongated components for fixtures.

[0002] In the field of processing components for fixtures, it is known to provide a planing machine of the type comprising an elongated base; a feeding device mounted to the base for defining a supporting plane for at least one component and for feeding the component itself along a given path; and a planing station arranged along the path and provided with two planing devices for the upper and lower faces of the component.

[0003] The feeding device generally comprises a plurality of lower supporting rollers apt to support the component at its lower face and a plurality of upper pressure rollers apt to engage the component at its upper face.

[0004] The known planing machines of the above-described type have some drawbacks mainly deriving from that the feeding device, by engaging the upper and lower faces of the components, cannot ensure a correct position of the components on the supporting plane and, in addition, makes further milling and/or drilling operations of the upper and lower faces of the components themselves relatively difficult to be performed.

[0005] It is an object of the present invention to provide a planing machine for planing components made of wood or the like, in particular elongated components for fixtures, which is free from the above-described drawbacks and which is simple and cost-effective to be implemented.

[0006] According to the present invention, there is provided a planing machine for planing components made of wood and the like, in particular elongated components for fixtures, as claimed in the appended claims.

[0007] 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 diagrammatic perspective view of a preferred embodiment of the planing machine of the present invention;

figure 2 is a diagrammatic plan view, with parts removed and parts enlarged for clarity, of the planing machine in figure 1;

figure 3 is a diagrammatic perspective view of a detail of the machine in figures 1 and 2; and

figures 4 and 5 are two diagrammatic perspective views, with parts enlarged for clarity, of a variant of the machine in figure 1 shown in two different operative positions.

[0008] With reference to figures 1, 2, and 3, numeral 1 indicates as a whole a planing machine for planing components 2 made of wood or the like for fixtures, each of which has, in this case, a substantially parallelepiped elongated shape, is limited by an upper face 2a and a lower face 2b substantially parallel to each other, and

is further limited by a side profile 3, which extends between the faces 2a, 2b, and is defined by two smaller side faces 2c, substantially parallel to each other and orthogonal to faces 2a, 2b, and by two larger side faces 2d substantially parallel to each other and orthogonal to faces 2a, 2b, and 2c.

[0009] Machine 1 comprises an elongated base 4 and a feeding device 5 apt to feed the components 2 over the base 4 itself in a substantially horizontal feeding direction 6 and along a substantially rectilinear path P extending in direction 6 between an inlet station 7 and an outlet station 8.

[0010] Device 5 has two grip and transfer units 9, each of which comprises a first slide 10 coupled to the base 4 in a known manner for making rectilinear movements in direction 6 and in a direction parallel and opposite to the direction 6 itself, along the base 4 and under the bias of an actuating motor 11; a second slide 12 coupled to the slide 10 in a known manner for making rectilinear movements in a substantially vertical direction 14 orthogonal to direction 6, along the slide 10 and under the bias of an actuating motor 13; a third slide 15 coupled to the slide 12 in a known manner for making rectilinear movements in a substantially horizontal direction 17 orthogonal to directions 6 and 14, along the slide 12 and under the bias of an actuating motor 16; and a grip and transfer element 18 mounted to the slide 15 in a position facing the element 18 of the other unit 9.

[0011] Element 18 comprises a first jaw 19, which is fixed to the slide 15, is substantially L-shaped, and extends in direction 17 on a substantially horizontal plane, and a second jaw 20, which extends in direction 17 on a substantially horizontal plane, and is slidably coupled to the slide 15 for making rectilinear movements in direction 17 between a clamping position and a releasing position of a component 2, with respect to the jaw 19 and under the bias of an actuator cylinder 21 mounted to the slide 15.

[0012] The two jaws 19, 20 are shaped so as to exclusively engage the component 2 at the side profile 3 thereof, in particular at the faces 2d and at one of the faces 2c, and so as to leave the faces 2a, 2b completely free.

[0013] Machine 1 further comprises a planing station 22, a smoothing station 23, and a milling and/or drilling station 24 sequentially arranged in this order along the path P in direction 6.

[0014] Station 22 comprises two planing devices 25 for the faces 2a and 2b, respectively, arranged over each other in direction 14. Each device 25 comprises an electrospindle 26, which has a longitudinal axis 27 parallel to direction 17, is provided with a planing tool 28 of known type engaged on the electrospindle 26 itself, and is coupled to the base 4 in a known manner for making rectilinear movements in direction 14 according to the thickness of the components 2, with respect to the base 4 and under the bias of an actuating motor 29.

[0015] Station 23 comprises two smoothing devices 30 for the faces 2a and 2b, respectively, arranged over each other in direction 14. Each device 30 comprises a

smoothing belt 31 wound as a loop about a plurality of motorized pulleys 32 mounted to rotate about corresponding longitudinal axes 33 parallel to direction 17, and is coupled to the base 4 in a known manner for making rectilinear movements in direction 14 in phase with the corresponding electrospindle 26, with respect to the base 4 and under the bias of the motor 29 according to the thickness of the components 2.

[0016] Station 24 comprises, in this case, two electrospindles 34, which have respective longitudinal axes 35 parallel to each other and to direction 14, are arranged side-by-side in direction 6, are coupled to the base 4 in a known manner for making rectilinear movements in direction 14, with respect to the base 4 and under the bias of respective operating devices (known and not shown), and are apt to carry out milling and/or drilling operations of face 2a.

[0017] According to a variant (not shown), the station 24 is provided with at least one further electrospindle arranged and oriented to carry out milling and/or drilling operations of face 2b.

[0018] Outlet station 8 is provided with a device 36 for removing the components 2 from the elements 18 of the device 5. Device 36 comprises a gantry frame 37, which extends in direction 6, and comprises in turn two vertical uprights 38 parallel to each other and to direction 14, and a cross element 39 extending in direction 6 for connecting the upper free ends of the uprights 38 themselves to each other.

[0019] Cross element 39 supports two grip and transfer units 40, each of which comprises a first slide 41 coupled to the cross element 39 in a known manner for making rectilinear movements in direction 6 and in a direction parallel and opposite to the direction 6 itself, along the cross element 39 and under the bias of an actuating motor 42; a second slide 43 coupled to the slide 41 in a known manner for making rectilinear movements in direction 14, along the slide 41 and under the bias of an actuating motor 44; and a grip and transfer element 45 mounted to the slide 43 in a position facing the device 5.

[0020] Element 45 comprises a lower jaw 46, which is fixed to the slide 43, is substantially L-shaped, and extends in direction 14 on a substantially vertical plane, and an upper jaw 47, which extends in direction 14 on a substantially vertical plane, and is slidably coupled to the slide 43 for making rectilinear movements in direction 17, with respect to the jaw 46 and under the bias of an actuator cylinder 48 mounted to the slide 43, between a clamping position and a releasing position of a component 2, which is engaged by the jaws 46, 47 at the faces 2a, 2b.

[0021] Finally, it is worth specifying that, in this case, the base 4 has a supporting plane A of the components 2 along at least part of the path P, the supporting plane A being at least partially defined by idle rollers 49 mounted to rotate about respective longitudinal axes 50 substantially parallel to one another and to direction 17. The presence of the grip and transfer elements 18 obviously

allows to shape the plane A according to the size and/or shape of the components 2 and/or to the operations to be carried out on the components 2 themselves so as to substantially allow any operation on the faces 2a, 2b of components 2.

[0022] In use, component 2 is fed in a known manner in direction 6 into the inlet station 7, at which the component 2 is locked within the grip and transfer elements 18 of the feeding device 5.

[0023] During its feeding into station 7, the profile of the component 2 is controlled by means of a feeler device 51 of known type mounted at the inlet of the station 7 over the path P in order to allow to selectively adjust the position of the elements 18 in direction 14. In other words, when component 2 has a curved profile commonly referred to as "warped profile", the position of the elements 18 in direction 14 is selectively controlled in response to a signal of the device 51 so as to ensure the component 2 being horizontal and coplanar to plane A.

[0024] At this point, the component 2 is fed by the device 5 in direction 6 firstly through the stations 22, 23, and 24 in order to allow the planing devices 25 and possibly the smoothing devices 30 and/or the electrospindles 34 to carry out the corresponding processing operations, and then into the output station 8, where the elements 18 of the device 5 release the component 2 within the elements 45 of the device 36.

[0025] From the above, it derives that when performing the expected operations, the component 2 is constantly held inside the pocket defined by the elements 18 without ever being released from the elements 18 themselves.

[0026] The variant shown in figures 4 and 5 relates to a machine 52, which differs from machine 1 in that:

each jaw 19 is suppressed and replaced by a jaw 53 pivotally coupled to the slide 15 for rotating about a rotation axis 54 parallel to direction 17, with respect to the slide 15 and under the bias of an operating device (known and not shown), between a first operative position, in which the jaw 53 engages the corresponding face 2c as shown in figures 1, 2, and 3, and a second operative position (figures 4 and 5), in which the jaw 53 disengages the corresponding face 2c; and

the outlet station 8 is suppressed and replaced by a transversal tenoning station 55 and a longitudinal profiling station 56 sequentially arranged in this order downstream of the station 24 in direction 6.

[0027] Tenoning station 55 comprises an electrospindle (known and not shown), which has a longitudinal axis 57 parallel to direction 14, is slidably coupled to the base 4 for making rectilinear movements in direction 17, with respect to the base 4 and under the bias of an operating device (known and not shown), and supports a tool 58 apt to tenon the two faces 2c.

[0028] According to a variant (not shown), machine 52 further comprises at least one further processing station

for the faces 2c which is either alternative or auxiliary to the station 55, e.g. a horizontal drilling and/or pin inserting station.

[0029] Profiling station 56 comprises a pushing element 59, which is movable along a slot 60 obtained at an upper surface of the base 4 parallelly to direction 6, and is further movable in direction 14 between a lowered rest position, in which the element 59 is substantially contained within the slot 60 for allowing the components 2 to pass, and a raised operative position, in which the element 59 protrudes outwards from the slot 60 in direction 14 for engaging a component 2 at the back and feeding it in the direction 6 itself.

[0030] Component 2 is fed by the element 59 under a pressure roller 61 apt to clamp the component 2 itself against the base 4 and, in this case, through four profiling tools 62, which are divided into two pairs of tools 62 arranged on opposite sides of the component 2 in direction 17, are apt to longitudinally profile the two faces 2d, and are mounted to respective electrospindles 63, each of which rotates the corresponding tool 62 about a longitudinal axis 64 thereof, parallel to direction 14, and is coupled to the base 4 for making rectilinear movements in directions 14 and/or 17 with respect to the base 4 itself.

[0031] In use, downstream of the station 24, each jaw 53 is moved to its second operative position for disengaging the corresponding face 2c and allowing the tool 58 to tenon the face 2c itself (figure 4).

[0032] Unit 9 arranged in front of the component 2 in direction 6 is then stopped upstream of station 56; and the corresponding jaw 20 is moved to its releasing position of the component 2 for allowing the unit 9 arranged on the back of the component 2 in direction 6 to feed the component 2 upstream of the pushing element 59 (figure 5).

[0033] At this point, the jaw 20 of the rear unit 9 is moved to its releasing position of the component 2 for allowing the element 59 to feed the component 2 through the station 56 and to the outlet of the machine 52.

Claims

1. A planing machine for planing components (2) made of wood or the like, in particular elongated components (2) for fixtures, the planing machine comprising a feeding device (5) for feeding at least one component (2) in a first direction (6) and along a path (P) which are substantially horizontal to each other; and a planing station (22) arranged along the path (P) and provided with two planing devices (25) apt to plane an upper face (2a) and a lower face (2b) of the component (2); and being **characterized in that** the feeding device (5) comprises grip and transfer means (9) movable to at least one first clamping position of the component (2), wherein the grip and transfer means (9) exclusively engage the component (2) at a side profile (3) thereof extending be-

tween said upper and lower faces (2a, 2b).

2. A planing machine according to claim 1, wherein the side profile (3) comprises two smaller side faces (2c) substantially perpendicular to the first direction (6); the grip and transfer means (9) being movable to a second clamping position of the component (2), wherein said grip and transfer means (9) themselves disengage said smaller side faces (2c).
3. A planing machine according to claim 2 and further comprising a first operating station (55) mounted along the path (P) and provided with at least one tool (58) apt to process said smaller side faces (2c) when the grip and transfer means (9) are arranged in said second clamping position.
4. A planing machine according to any one of the preceding claims, wherein the side profile (3) comprises two larger side faces (2d) substantially parallel to the first direction (6); the planing machine comprising a second operating station (56) mounted along the path (P) and provided with at least one tool (62) apt to process said larger side faces (2d).
5. A planing machine according to claim 4, wherein the feeding device (5) further comprises feeding means (59), which are apt to feed the component (2) through the second operating station (56), are connected to the grip and transfer means (9) at a transfer station of the component (2), and are shaped to maintain said larger side faces (2d) free.
6. A planing machine according to any one of the preceding claims and further comprising supporting means (4, 49) defining a substantially horizontal supporting plane (A) for the component (2) along part of said path (P).
7. A planing machine according to any one of the preceding claims, wherein the grip and transfer means (9) comprise two clamping elements (18) apt to engage the front and rear ends of the component (2), exclusively at the side profile (3) of the component (2) itself, when arranged in said first clamping positions thereof.
8. A planing machine according to claim 7, wherein the side profile (3) comprises two smaller side faces (2c) substantially perpendicular to the first direction (6) and two larger side faces (2d) substantially parallel to the first direction (6) itself; each clamping element (18) being mounted to rotate between said first clamping position and a second clamping position of the component (2), wherein the clamping element (18) itself disengages said smaller side face (2c).
9. A planing machine according to claim 7 or 8 and

further comprising a device (36) for removing the component (2) from the feeding device (5); the removing device (36) comprising at least one further clamping element (45) apt to engage the component (2) at said upper and lower faces (2a, 2b).

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10. A planing machine according to claim 9, wherein the clamping elements (18) of the feeding device (5) and the further clamping element (45) of the removing device (36) are movable with respect to one another in a second direction (17) substantially horizontal and transversal to the first direction (6). 10
11. A planing machine according to claim 9 or 10, wherein each further gripping element (45) is movable in the first direction (6). 15
12. A planing machine according to any one of the claims from 7 to 11 and further comprising a control device (51) for controlling a profile of the component (2); an operating device (13) being provided for moving at least one clamping element (18) of the feeding device (5) in a third direction (14) substantially vertical and orthogonal to the first direction (6) when the profile of the component (2) is different from a flat profile. 20 25
13. A planing machine according to any one of the preceding claims and further comprising a smoothing station (23), which is arranged along said path (P) downstream of the planing station (22) in the first direction (6), and is provided with two smoothing belts (31) for said upper and lower faces (2a, 2b). 30
14. A planing machine according to claim 13, wherein each planing device (25) and each smoothing belt (31) are movable in a third direction (14) substantially vertical and orthogonal to the first direction (6) according to the thickness of the component (2). 35
15. A planing machine according to any one of the preceding claims and further comprising at least one electrospindle (34), which is arranged along said path (P) to carry out milling and/or drilling operations of the component (2), and has a longitudinal axis (35) substantially vertical and orthogonal to the first direction (6). 40 45

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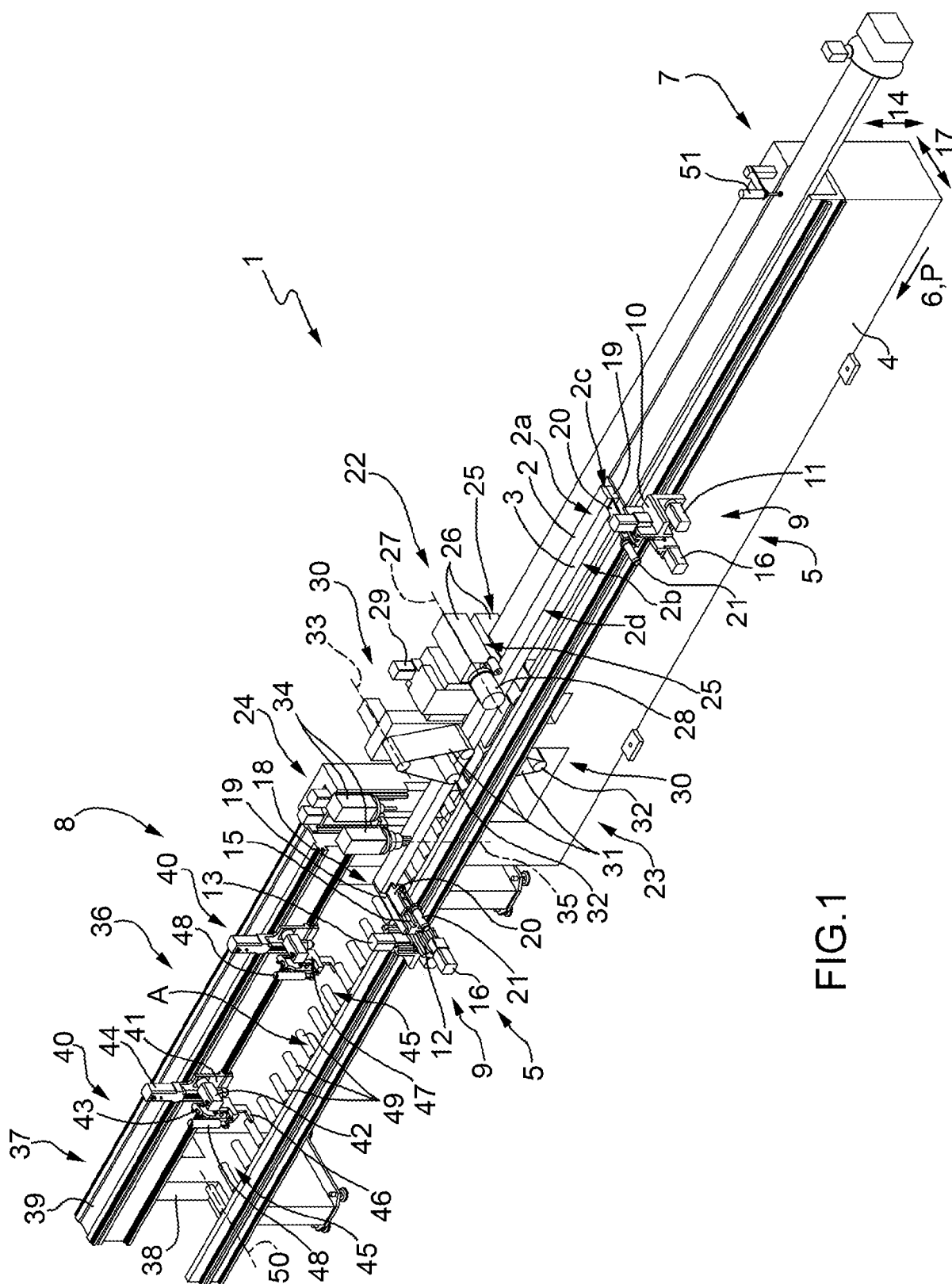
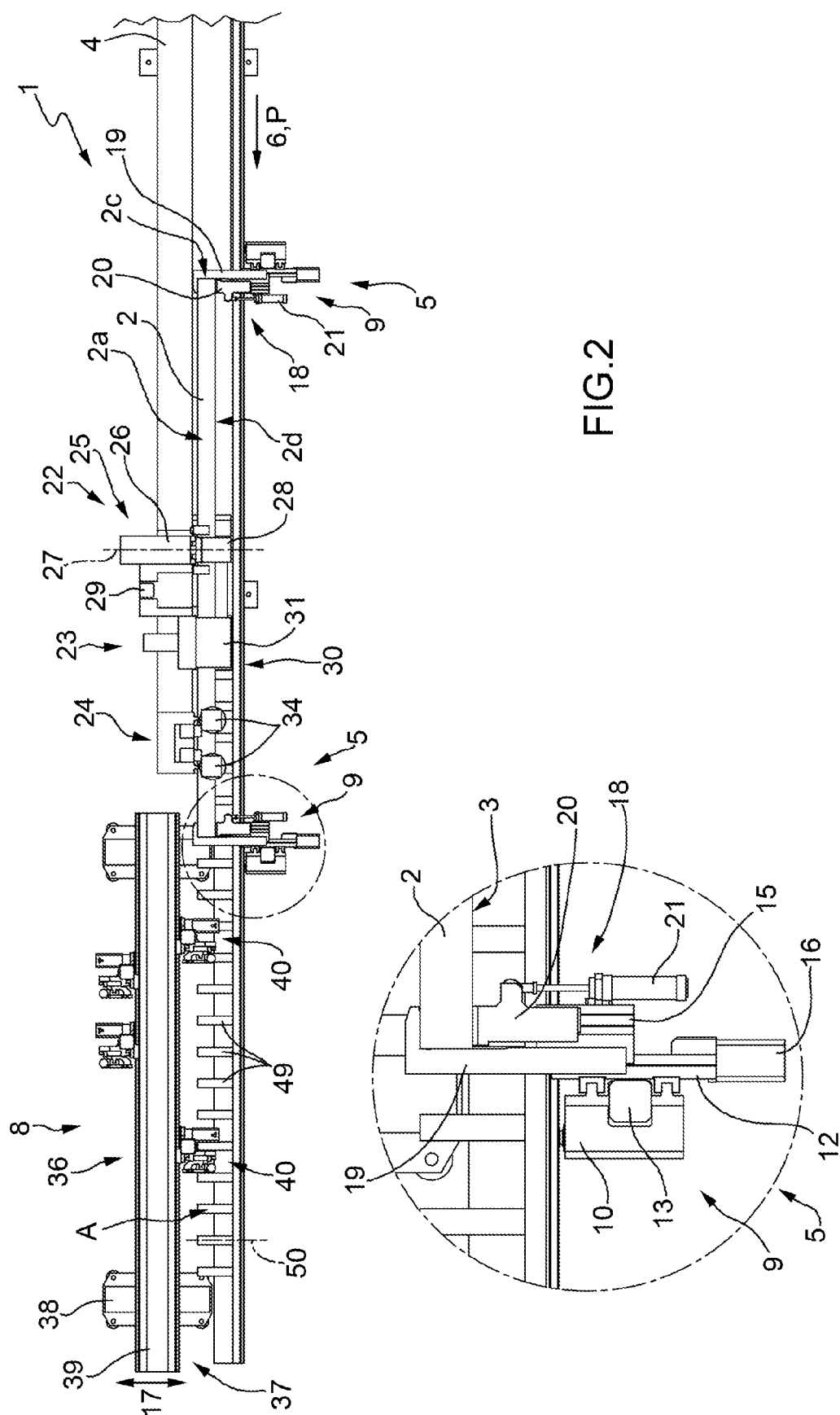


FIG.1



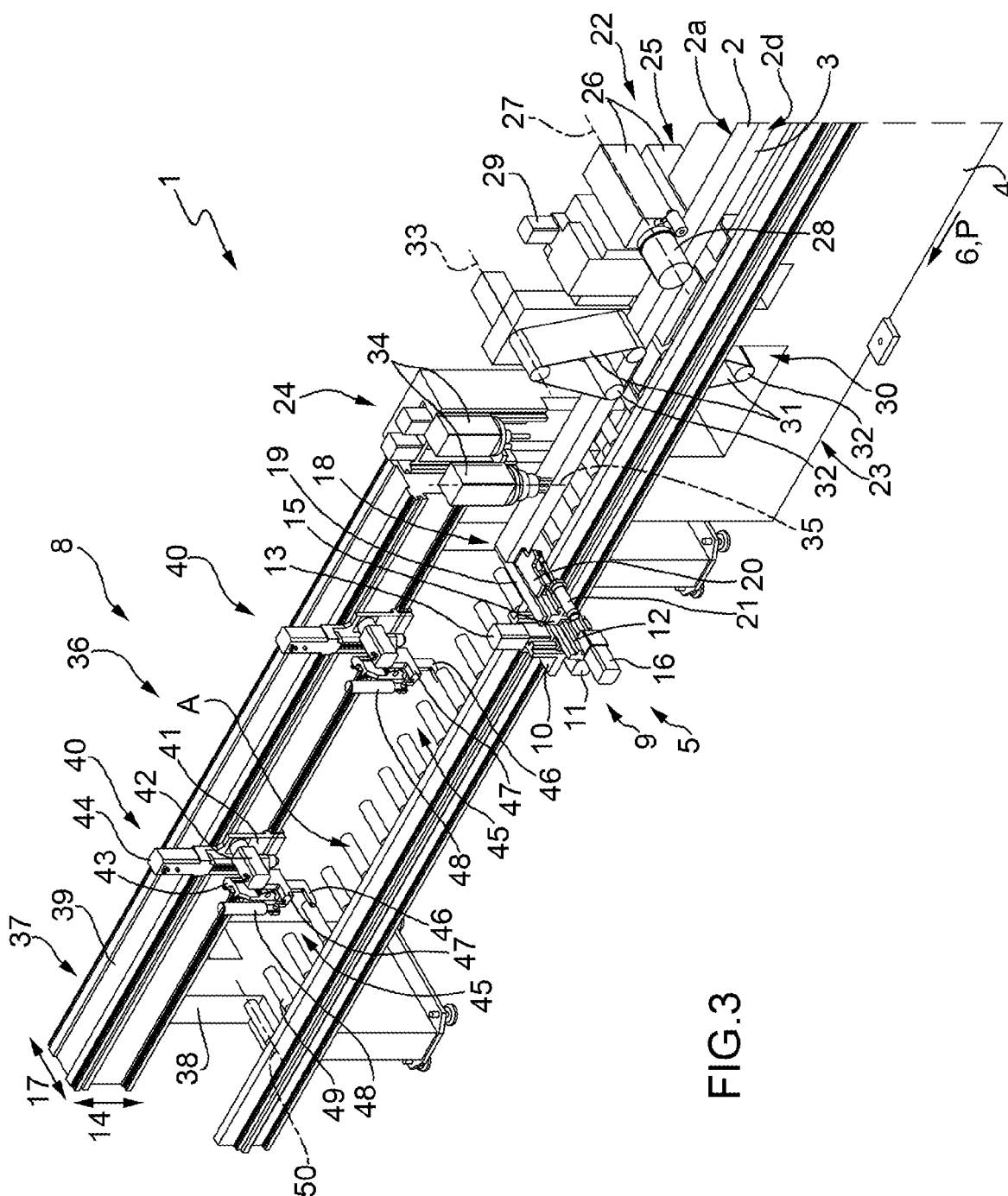


FIG.3

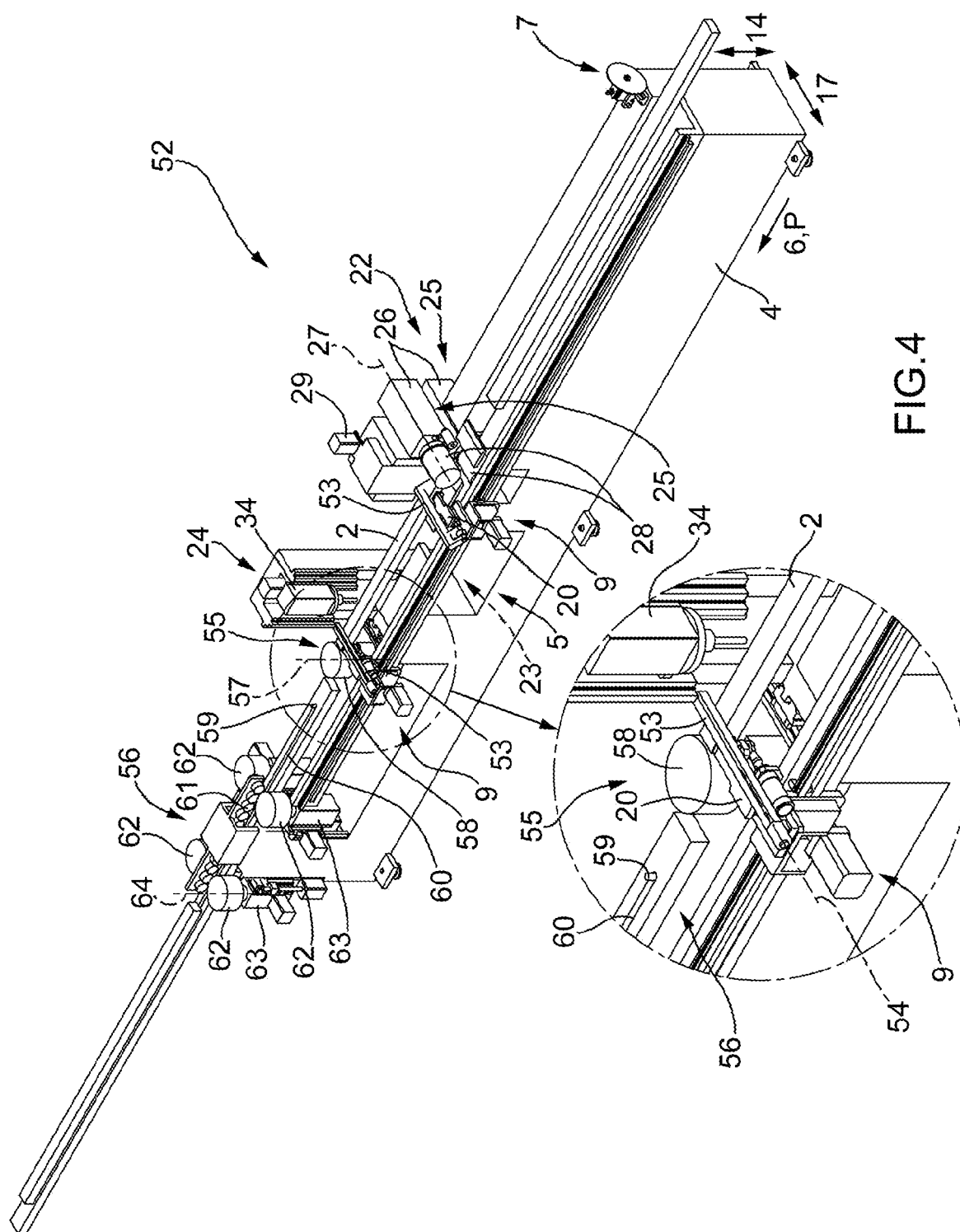


FIG. 4

