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(54) **A method and machine for profiling elongated wood components or the like, specifically components for door and window frames**

(57) A method and machine for profiling elongated wood components (2) or the like, according to which each component (2) is transversally fed along a resting plane (P1) and against a stopper device (23), is raised from the resting plane (P1) and moved downstream of the stopper device (23) by means of at least one clamping vice (38) movable between a lowered position, in which the clamping vice (38) is arranged underneath the resting plane (P1), and a raised position, in which the clamping vice (38) protrudes over the resting plane (P1) itself, and is longitudinally profiled by means of at least one operating head (16).

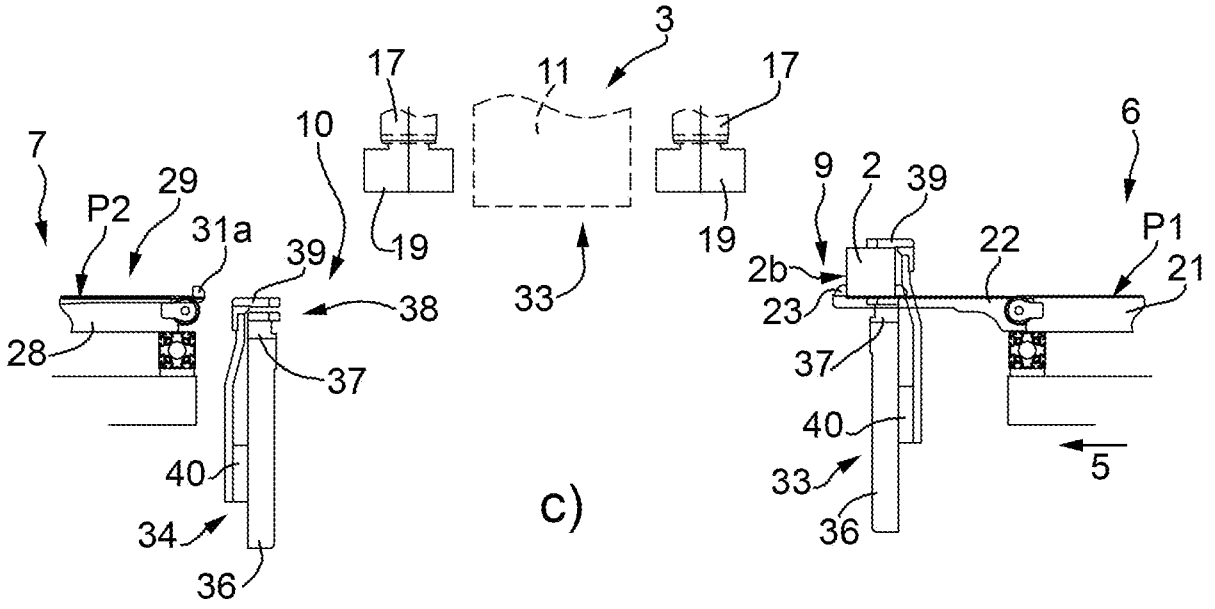

FIG.4

EP 2 105 269 A2

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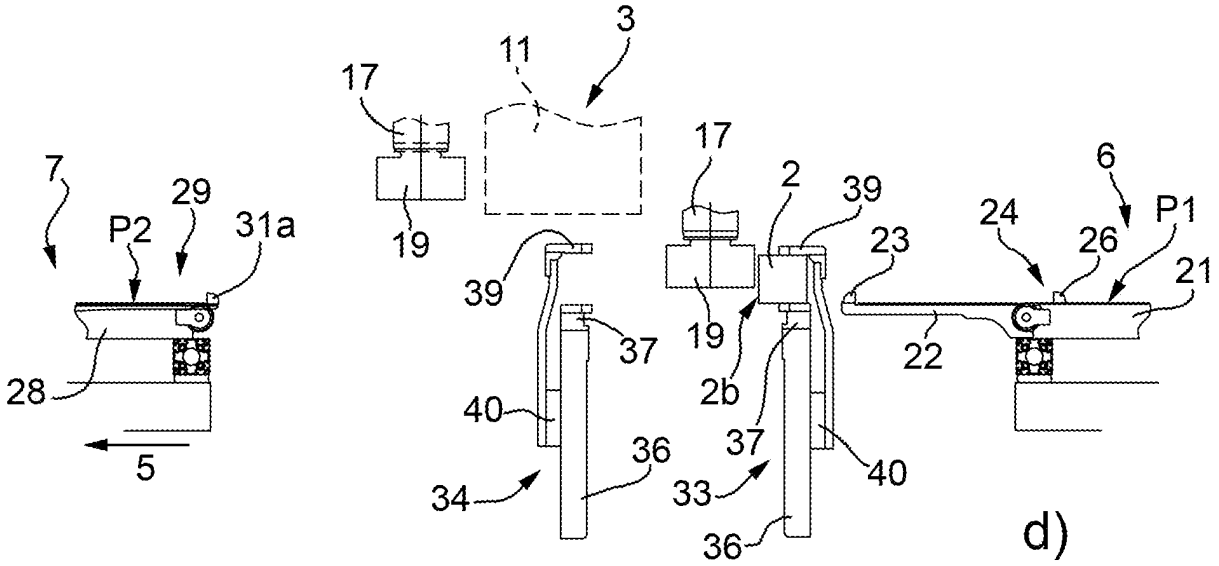
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FIG.4

Description

[0001] The present invention relates to a method for profiling elongated wood components or the like, specifically components for door and window frames.

[0002] In the field of profiling door and window frame components, it is known to provide a machine of the type comprising a feeding device for feeding at least one component along a substantially horizontal resting plane and in a feeding direction transversal to the longitudinal faces of the component itself; and at least one first clamping vice having a lower jaw substantially coplanar to the resting plane and an upper jaw movable over the resting plane between a position of clamping and a position of releasing the component.

[0003] The component is fed by the feeding device through the two jaws of the first clamping vice and against a stopper device arranged transversally to the feeding direction to correctly stop the component in the feeding direction itself.

[0004] Once the component has been clamped inside the first clamping vice, an operating head transversally movable to the feeding direction longitudinally profiles a first longitudinal face of the component, i.e. the longitudinal face protruding out from the first clamping vice itself.

[0005] The machine further comprises a second clamping vice, which is entirely similar to the first clamping vice, and is adapted to receive the component from the first clamping vice to allow the operating head to longitudinally profile a second longitudinal face of the component, i.e. the longitudinal face protruding out from the second clamping vice itself.

[0006] As the upper jaws of the clamping vices extend over the resting plane, the known machines for profiling wood components or the like of the above-described type are relatively cumbersome and furthermore imply a relatively complex, costly handling of the upper jaws over the resting plane.

[0007] It is an object of the present invention to provide a method for profiling elongated 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, there is provided a method for profiling elongated wood components or the like as claimed in claims from 1 to 8.

[0009] The present invention further relates to a machine for profiling elongated wood components or the like.

[0010] According to the present invention, there is provided a machine for profiling elongated wood components or the like as claimed in claims from 9 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;

figure 2 is an enlarged perspective view of a first detail of the machine in figure 1;

figure 3 is a schematic perspective view of a second detail of the machine in figure 1; and

figure 4 schematically shows the operating principle of the machine in figure 1.

[0012] With reference to figure 1, numeral 1 indicates as a whole a machine for profiling elongated wood components 2 or the like for door and window frames, comprising an operating unit 3 for profiling the components 2; a feeding line 4 adapted to feed the components 2 in a substantially horizontal direction 5 and comprising, in turn, two feeding units 6, 7 arranged on opposite sides of unit 3 along direction 5; and a gripping and conveying unit 8, which is mounted at the operating unit 3, and is connected to units 6 and 7 at respective transferring stations 9, 10 for receiving the components 2 to be profiled from unit 6, holding the components 2 while profiling, and releasing the newly profiled components 2 onto unit 7.

[0013] Operating unit 3 comprises a gantry frame 11 comprising, in turn, two vertical uprights 12 parallel to each other and a crosspiece 13, which is fixed at the free ends of the uprights 12, extends in a substantially horizontal direction 14 which is transversal to direction 5, and is laterally limited along the direction 5 itself by two flat faces 15a, 15b, on each of which a corresponding operating head 16 is mounted.

[0014] Head 16 is coupled to the crosspiece 13 in a known manner, in order to make rectilinear movements in the direction 14, along the crosspiece 13 and under the bias of an actuating device of known type (not shown), and supports at least one electrospindle 17, which is mounted to the head 16 in a known manner for making rectilinear movements in a vertical direction 18 which is orthogonal to the directions 5 and 14, with respect to the head 16 and under the bias of an actuating device of known type (not shown), and is provided with a profiling tool 19 (figure 4) of known type which is engaged on the electrospindle 17 itself.

[0015] Feeding unit 6 is adapted to feed the components 2 in sequence from an inlet station 20 to the station 9, and comprises a plurality of belt conveyors 21 parallel to one another, which extend in the direction 5, and define a substantially horizontal resting plane P1 for the components 2. Unit 6 further comprises a plurality of supporting bars 22, each front of which protrudes from a corresponding conveyor 21 in direction 5, is limited at the top by a resting plane substantially coplanar to plane P1, and has a stopper element 23 protruding upwards from a free end of the corresponding bar 22, and cooperates with the stopper elements 23 of the other bars 22 to ensure a correct positioning of each component 2 in the direction 5.

[0016] As shown in figure 2, components 2 are transferred by the conveyors 21 onto the bars 22 and against the elements 23 by means of a pushing device 24 com-

prising a slide (not shown) movable in the direction 5 with respect to the conveyors 21, and a supporting bar 25 parallel to the direction 14 and coupled to the mentioned slide (not shown) in a known manner, in order to make rectilinear movements in the direction 18 with respect to the slide itself (not shown).

[0017] Bar 25 supports a plurality of elongated pushing elements 26, which are distributed along the bar 25 in the direction 14, which fronts protrude from the bar 25 in the direction 5, and are moved by the bar 25 itself in the direction 18 between a lowered position, in which the elements 26 are arranged underneath the plane P1, and a raised position in which the elements 26 protrude over the plane P1 to engage the back of each component 2 in the direction 5.

[0018] With reference to figure 1, feeding unit 7 is adapted to feed the components 2 in sequence from the station 10 to an outlet station 27, and comprises a plurality of belt conveyors 28 parallel to one another, which extend in the direction 5, and define a substantially horizontal resting plane P2 for the components 2 which is parallel to plane P1.

[0019] Furthermore, unit 7 comprises a dragging device 29 comprising, in turn, a slide 30, which extends in the direction 14 and is coupled to the conveyor 28 in a known manner in order to make rectilinear movements in the direction 5 with respect to the conveyors 28 themselves, and a plurality of supporting and dragging bars 31 distributed along the slide 30 in the direction 14.

[0020] The bars 31 have a substantially elongated L-shape, protrude from the back of slide 30 in the direction 5, are each provided with a respective end tooth 31a protruding upwards in the direction 18, are limited at the top by respective flat surfaces which are substantially coplanar to plane P2, and are moved by the slide 30 itself between an extracted position (figure 4g), in which the bars 31 protrude from the back of conveyors 28 in the direction 5, and a retracted position (figure 4h).

[0021] As shown the figures 1 and 3, the gripping and conveying unit 8 comprises two longitudinal guiding members 32, which extend in the direction 5, and are mounted to the frame 11 on opposite sides of the feeding line 4 in the direction 14, and two gripping and conveying devices 33, 34 facing each other and mounted in sequence on the longitudinal members 32 in the direction 5 itself.

[0022] Each device 33, 34 comprises two runners 35, which are coupled to the longitudinal members 32 so as to slide and make rectilinear movements in the direction 5, along the longitudinal members 32 and under the bias of a known actuating device (not shown), and support a slide 36, which extends between the two runners 35 in the direction 14, and is coupled 35 so as to slide and make rectilinear movements in the direction 18, with respect to the runners 35 themselves and under the bias of a known actuating device (not shown).

[0023] A plurality of lower jaws 37 are fixed onto the upper surface of the slide 36 (in this case twenty lower jaws 37) of corresponding clamping vices 38 further comprising respective upper jaws 39, which are equal in number to the number of jaws 37, are substantially L-shaped and are divided into a plurality of groups of jaws 39 (in this case two groups of jaws 39) independent from one another.

[0024] The jaws 39 of each group of jaws 39 protrude upwards from a corresponding supporting slide 40 coupled to the slide 36 in a known manner to make rectilinear movements in the direction 18 between a position of clamping and a position of releasing at least one component 2, with respect to the slide 36 and under the bias of a plurality of actuating cylinders 41 (in this case three actuating cylinders 41) fixed to the slide 36 itself.

[0025] The vices 38 of the device 33 are mounted in a staggered position with respect to supporting bars 22 and pushing elements 26 of unit 6 in the direction 14, while the vices 38 of the device 34 face the jaws 38 of the device 33 and are mounted in a staggered position with respect to the supporting bars 31 of unit 7 in the direction 14.

[0026] The operation of machine 1 will now be described with reference to figure 4, assuming that a single component 2 is profiled, and from a moment in which (figure 4a):

- the vices 38 of the device 33 are arranged in a lowered position underneath the plane P1;
- the component 2 has been loaded onto the feeding unit 6 at the inlet station 20 with its longitudinal faces 2a, 2b arranged transversally to the direction 5; and
- the component 2 has been fed by the belt conveyors 21 in the direction 5 and to the inlet of the supporting bars 22.

[0027] Component 2 is thus fed by the pushing elements 26 of the pushing device 24 along the supporting bars 22 and against the stopper elements 23 to correctly place the component 2 in the direction 5 and to ensure that the component 2 itself is perfectly parallel to the direction 14 (figure 4b).

[0028] At this point, the clamping vices 38 of the gripping and conveying device 33 are moved to a raised position, in which the corresponding lower jaws 37 are arranged substantially coplanar to plane P1 and the corresponding upper jaws 39 protrude over the plane P1; the device 33 is fed in the direction 5; and the jaws 39 themselves are moved to the their position of clamping the component 2 (figure 4c).

[0029] By combining the movement of the device 33 in the direction 5 with the movement of the corresponding vices 38 in the direction 18, the component 2 is raised from plane P1 and fed downstream of the stopper elements 23 to allow the operating head 16 mounted to the face 15a to longitudinally profile the face 2b protruding out from the vices 38 themselves in the direction 14 (figure 4d).

[0030] Once the face 2b has been profiled, the com-

ponent 2 is transferred from the vices 38 of the device 33 to the vices 38 of the device 34 (figure 4e), and the operating head 16 mounted to the face 15b is moved in the direction 14 for longitudinally profiling the face 2a protruding out from the vices 38 themselves (figure 4f).

[0031] Once the face 2a has been profiled, the supporting bars 31 of the dragging device 29 are moved to the extracted position thereof, and the component 2 is firstly moved over the teeth 31a and then released onto the bars 31 themselves by combining the movement of the device 34 in the direction 5 with the movement of the corresponding vices 38 in the direction 18 (figure 4g).

[0032] Finally, the bars 31 are moved again in the direction 5 from their retracted position to transfer the component 2 onto the belt conveyors 28 of the feeding unit 7 (figure 4h), which feeds the component 2 to the outlet station 27 of machine 1.

[0033] According to a variant (not shown), the supporting bars 22 are movable between a lowered position, in which the corresponding stopper elements 23 are arranged underneath the plane P1, and a raised position in which the corresponding elements 23 protrude over the plane P1 itself. Similarly, the supporting bars 31 are movable between a lowered position, in which the corresponding teeth 31a are arranged underneath the plane P2, and a raised position in which the corresponding teeth 31a protrude over the plane P2 itself.

Claims

1. A method for profiling elongated wood components (2) or the like, specifically components (2) for door and window frames, the method comprising the steps of:

   feeding at least one component (2) along a first substantially horizontal resting plane (P1) in a first direction (5) which is transversal to two longitudinal faces (2a, 2b) of the component (2) itself;
   stopping the component (2) in the first direction (5) against a stopper device (23) arranged transversally to the first direction (5) itself;
   gripping the component (2) by means of at least one first clamping vice (38); and
   longitudinally profiling said one first longitudinal face (2b);
   and being **characterized in that** it further comprises the step of:
   raising the first clamping vice (38) from a first lowered position, in which the first clamping vice (38) is arranged underneath the first resting plane (P1), to a first raised position, in which the first clamping vice (38) protrudes over the first resting plane (P1) in order to grip the component (2) at said one second longitudinal face (2a) arranged at the back in said first direction (5).

2. A method according to claim 1 and further comprising the step of:

   moving the first clamping vice (38) from the first raised position so as to raise the component (2) from the first resting plane (P1) and feed the component (2) itself downstream of the stopper device (23) in the first direction (5).

3. A method according to claim 1 or 2, wherein the first resting plane (P1) is defined by a plurality of first belt conveyors (21) parallel to one another and a plurality of first supporting bars (22), the fronts of which protrude from the first belt conveyors (21) in the first direction (5), and are shaped so as to define the stopper device (23); the method comprising the steps of:

   feeding the component (2) along the first belt conveyors (21); and
   feeding the component (2) along the first supporting bars (22) and against the stopper device (23) by means of a pushing device (24) adapted to engage the back of the component (2) in the first direction (5).

4. A method according to claim 3 and further comprising the step of:

   moving the pushing device (24) between a second lowered position, in which the pushing device (24) is arranged underneath the first resting plane (P1), and a second raised position, in which the pushing device (24) protrudes over the first resting plane (P1) in order to engage the component (2).

5. A method according to any one of the preceding claims and further comprising the steps of:

   transferring the component (2) from the first clamping vice (38) to at least one second clamping vice (38) facing the first clamping vice (38) itself; and
   longitudinally profiling said second longitudinal face (2a).

6. A method according to claim 5 and further comprising the step of:

   moving at least one operating head (16) in a second direction (14) transversal to the first direction (5) for profiling said first and second longitudinal faces (2b, 2a).

7. A method according to claim 5 or 6 and further comprising the steps of:

   transferring the component (2) from the second

clamping vice (38) to a second resting plane (P2); and

moving the second clamping vice (38) from a third raised position, in which the second clamping vice (38) protrudes over the second resting plane (P2), to a third lowered position, in which the second clamping vice (38) is arranged underneath the second resting plane (P2).

8. A method according to claim 7, wherein the second resting plane (P2) is defined by a plurality of second belt conveyors (28) parallel to one another and a plurality of second supporting bars (31), which protrude from the back of the second belt conveyors (28) in the first direction (5), and are shaped so as to define respective dragging elements (31a) for the component (2) in the first direction (5) itself; the method comprising the steps of:

moving the second supporting bars (31) in the first direction (5) for transferring the component (2) onto the second belt conveyors (28); and

feeding the component (2) along the second belt conveyors (28).

9. A machine for profiling elongated wood components (2) or the like, specifically components (2) for door and window frames, the machine comprising a first feeding device (6) for feeding at least one component (2) along a first substantially horizontal resting plane (P1) and in a first direction (5) which is transversal to two longitudinal faces (2a, 2b) of the component (2) itself; a stopper device (23) arranged transversally to the first direction (5) to stop the component (2) in the first direction (5) itself; at least a first clamping vice (38) for gripping the component (2) at said one first longitudinal face (2a) arranged at the back in said first direction (5); and at least one operating head (16) movable in a second direction (14) transversal to the first direction (5) for longitudinally profiling at least said one second longitudinal face (2b); and being **characterized in that** the first clamping vice (38) is movable between a first lowered position, in which the first clamping vice (38) is arranged underneath the first resting plane (P1), and a first raised position, in which the first clamping vice (38) protrudes over the first resting plane (P1) to grip the component (2) at the first longitudinal face (2a).

10. A machine according to claim 9, wherein the first clamping vice (38) is movable from the first raised position to a second raised position, in which the first clamping vice (38) raises the component (2) from the first resting plane (P1) in order to feed it downstream of the stopper device (23) in the first direction (5).

11. A machine according to claim 9 or 10, wherein the first feeding device (6) comprises a plurality of first belt conveyors (21) parallel to one another, a plurality of first supporting bars (22), the fronts of which protrude from the first belt conveyors (21) in the first direction (5), and are shaped so as to define the stopper device (23), and a pushing device (24) to feed the component (2) along the first supporting bars (22) and against the stopper device (23).

12. A machine according to claim 11, wherein the pushing device (24) is movable between a second lowered position, in which the pushing device (24) is arranged underneath the first resting plane (P1), and a third raised position, in which the pushing device (24) protrudes over the first resting plane (P1) to engage the component (2).

13. A machine according to any one of the claims from 9 to 12 and further comprising at least one second clamping vice (38) to grip the component (2) at said second longitudinal face (2b).

14. A machine according to claim 13 and further comprising a further operating head (16) for profiling said first longitudinal face (2a).

15. A machine according to claim 13 or 14 and further comprising a second feeding device (7) defining a second resting plane (P2) for the component (2); the second clamping vice (38) being movable between a fourth raised position, in which the second clamping vice (38) protrudes over the second resting plane (P2), and a third lowered position, in which the second clamping vice (38) is arranged underneath the second resting plane (P2).

16. A machine according to claim 15, wherein the second feeding device (7) comprises a plurality of second belt conveyors (28) parallel to one another and a plurality of second supporting bars (31), which protrude from the back of the second belt conveyors (28) in the first direction (5), are shaped so as to define respective dragging elements (31a) for the component (2) in the first direction (5), and are movable in the first direction (5) itself to transfer the component (2) onto the second belt conveyors (28).

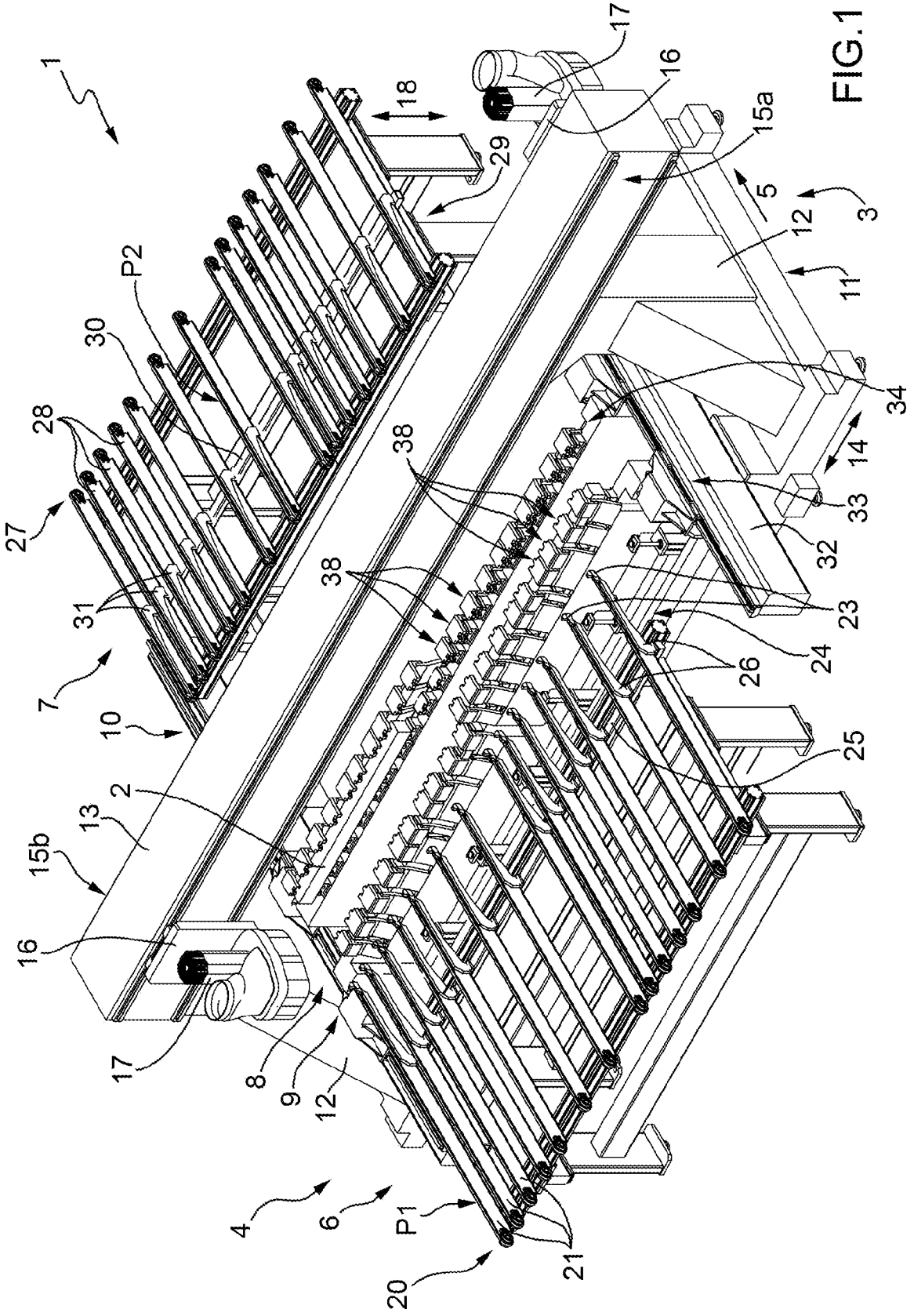
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FIG.1

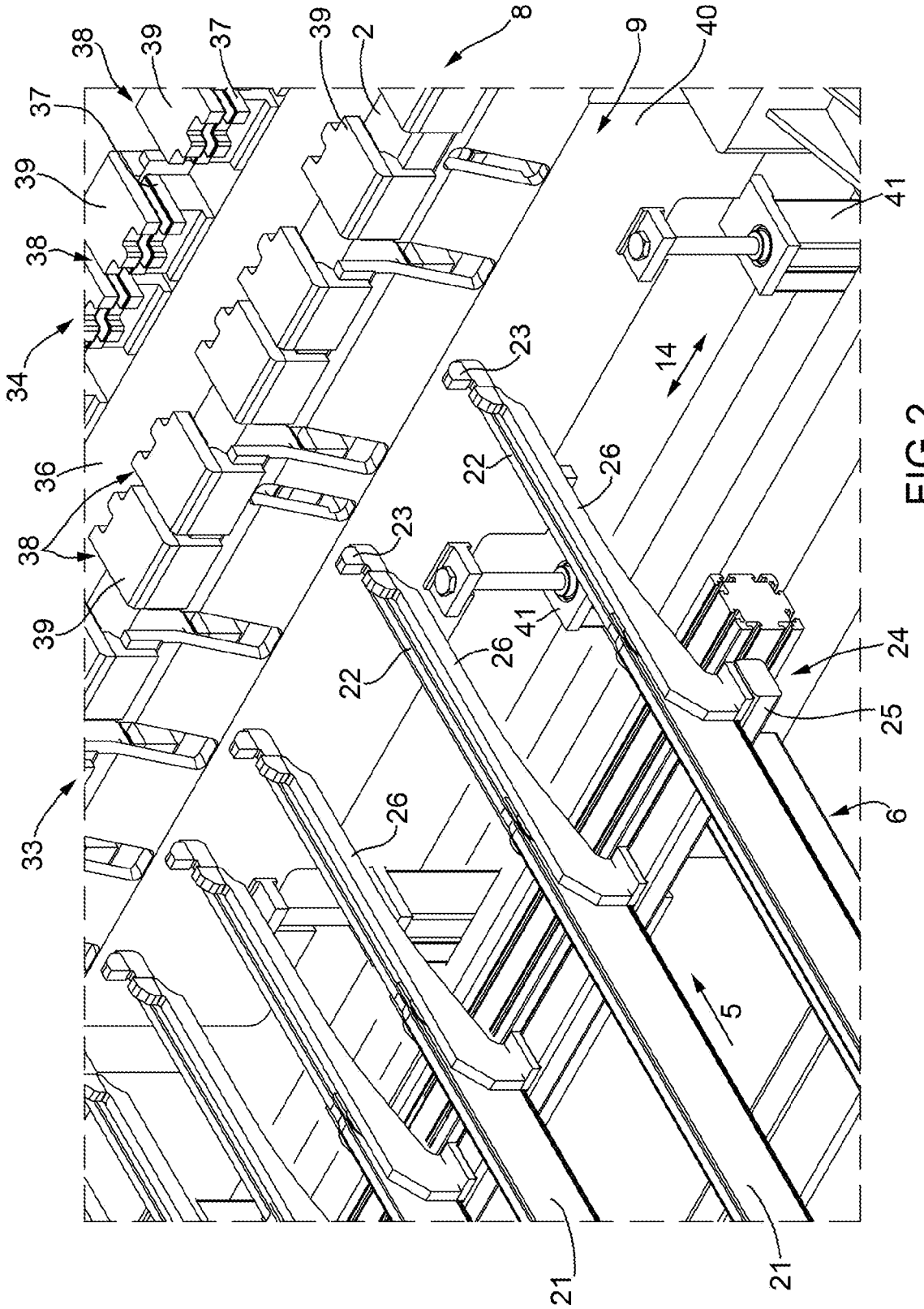
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FIG.2

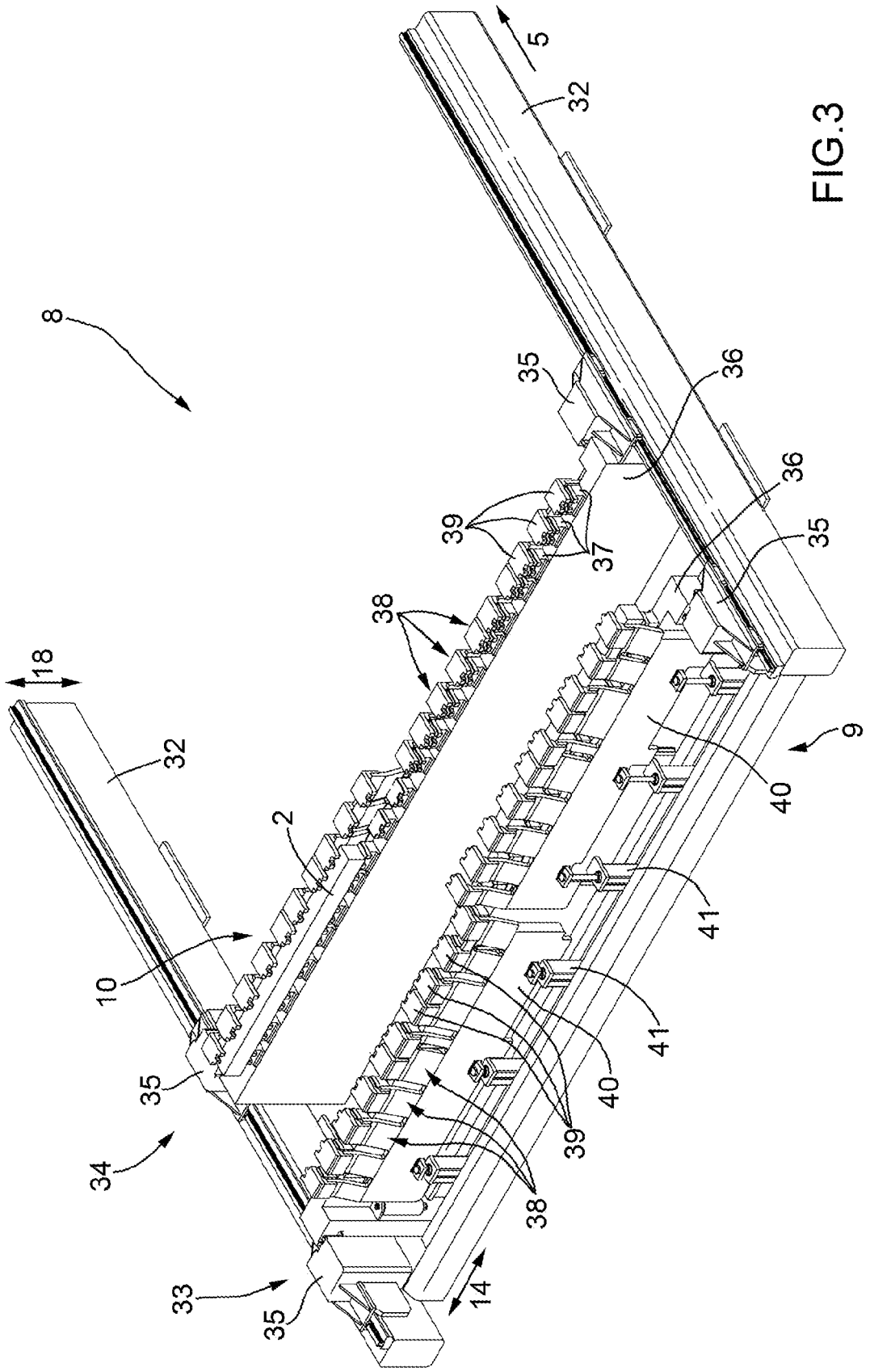

FIG.3

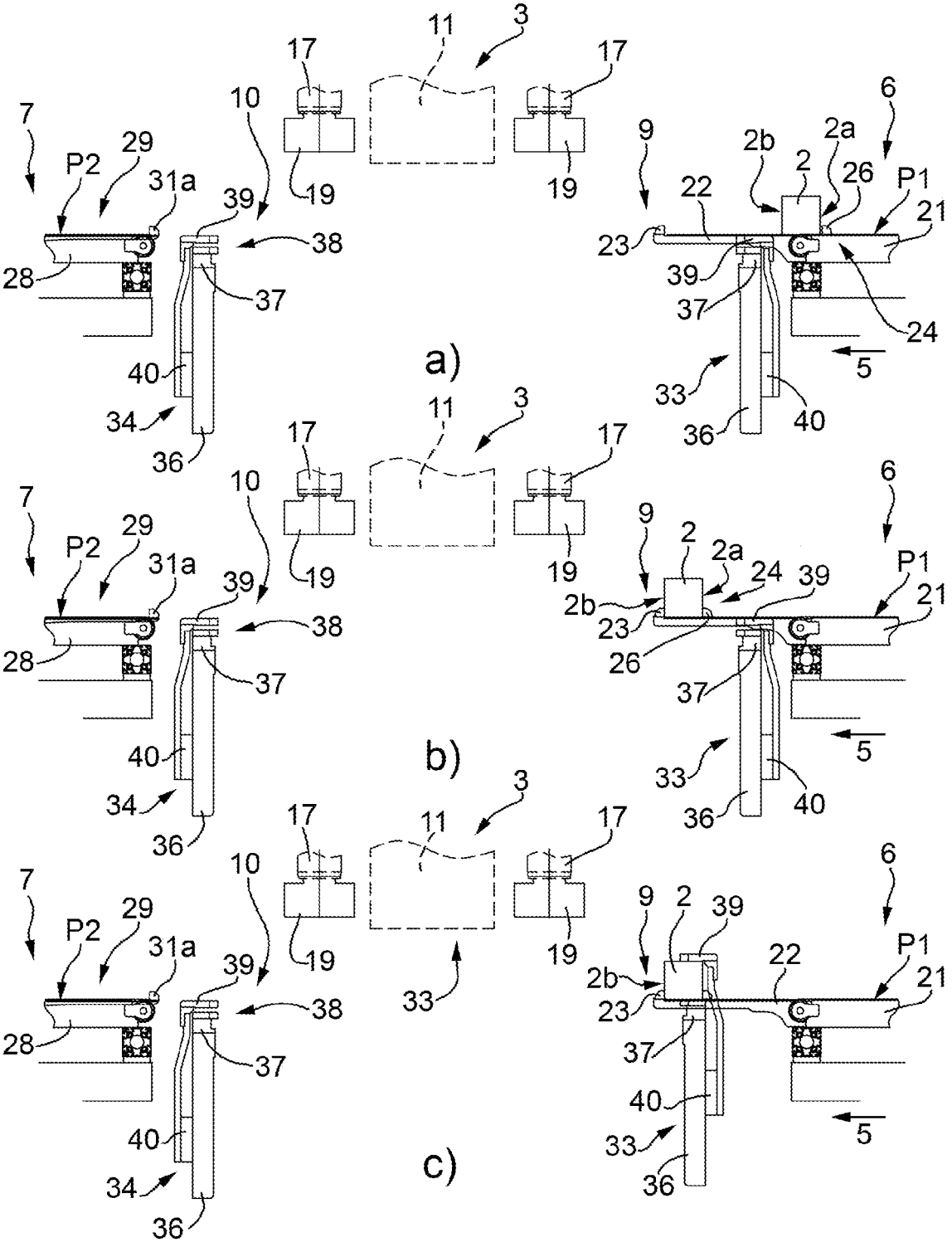
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FIG.4

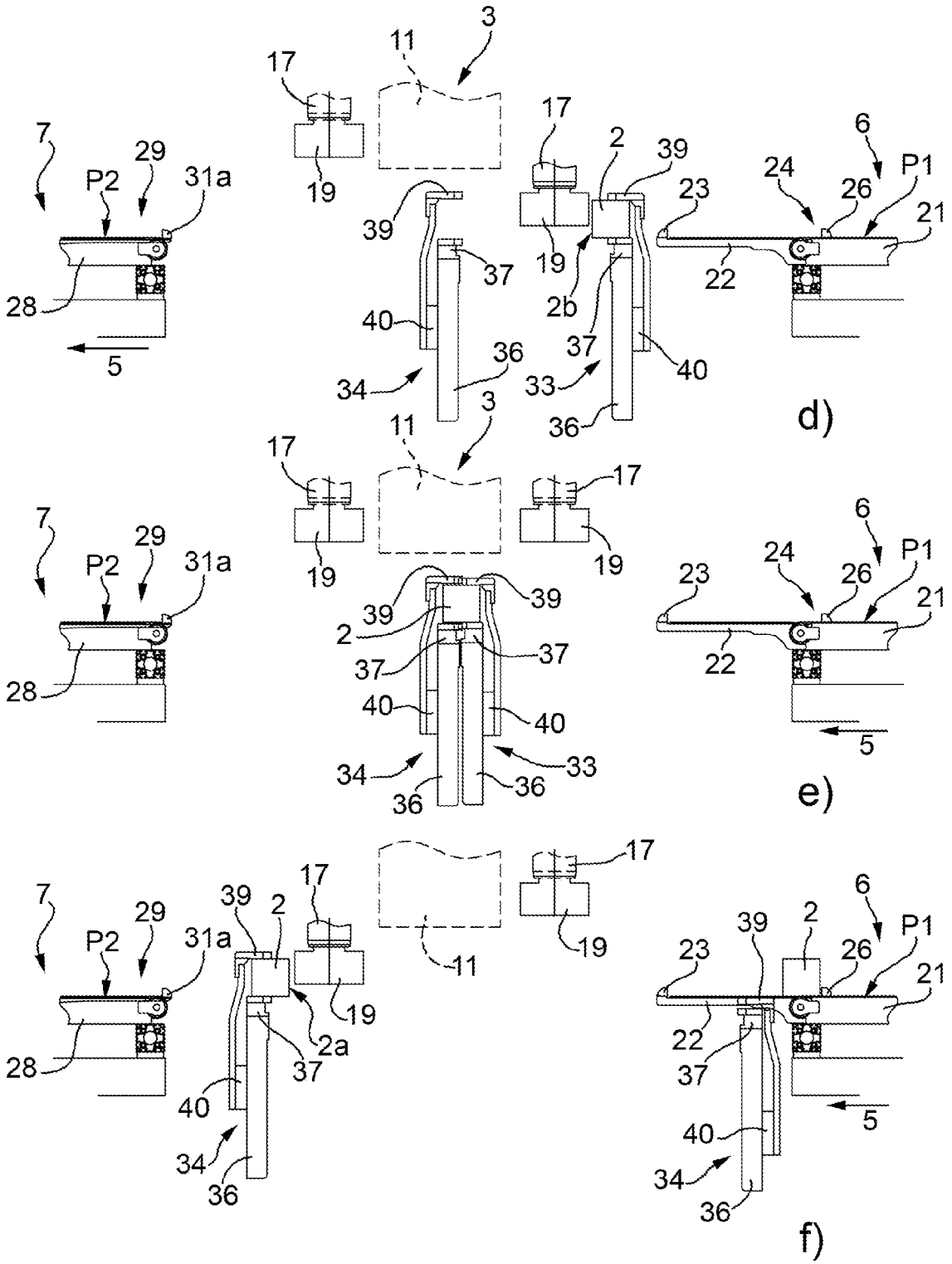
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FIG.4

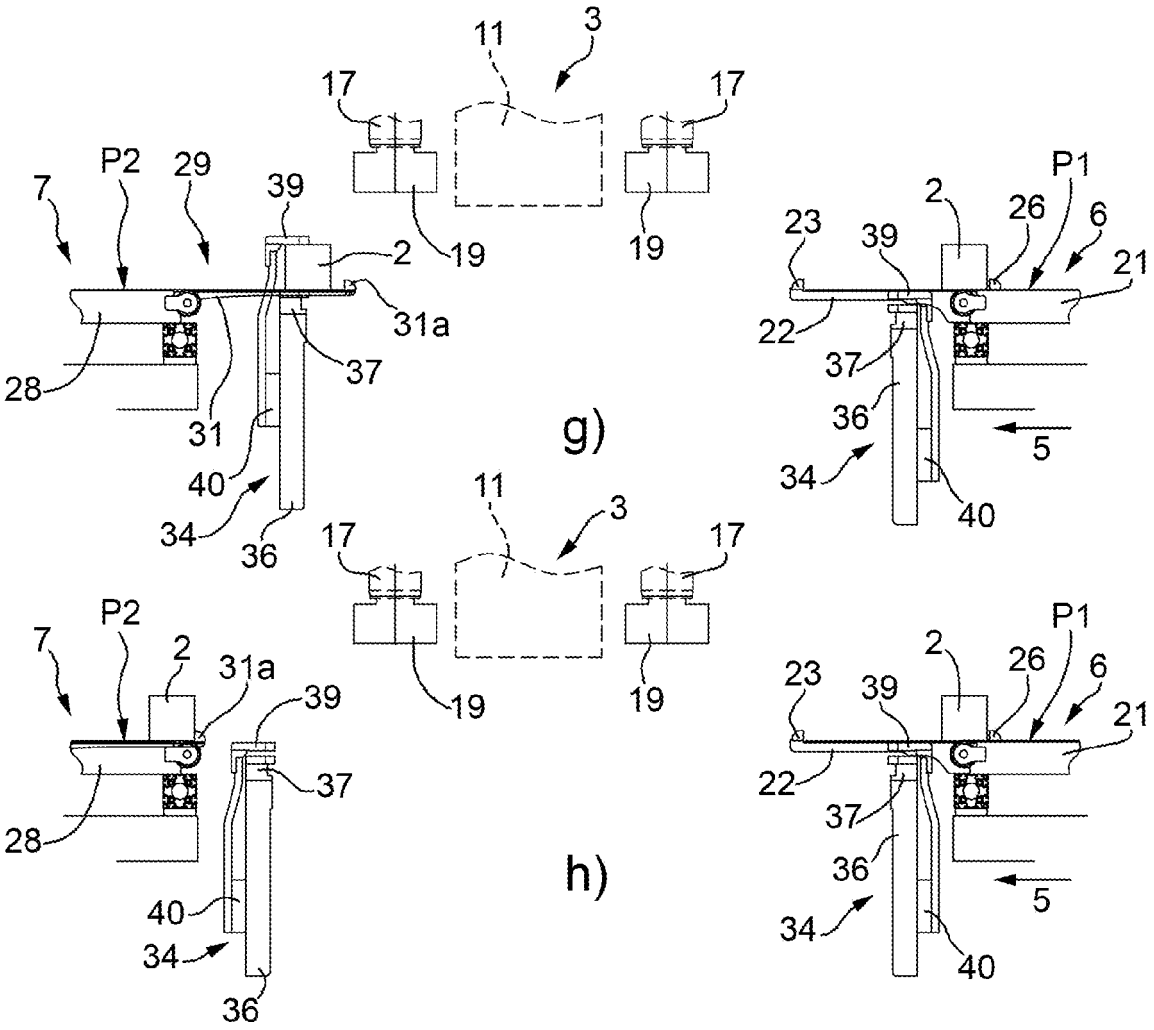
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FIG.4