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

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

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

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(54) **Method of machining component parts of wood or similar, in particular door and window frame component parts**

(57) A method of machining component parts (2) of wood or similar, wherein a feed device (19) provides for both feeding the component parts (2) to be machined to a grip-and-carry assembly (24) and receiving the machined component parts (2) from the grip-and-carry assembly (24); the grip-and-carry assembly (24) being provided for inserting and removing the component parts (2) into and from at least one clamp (16).

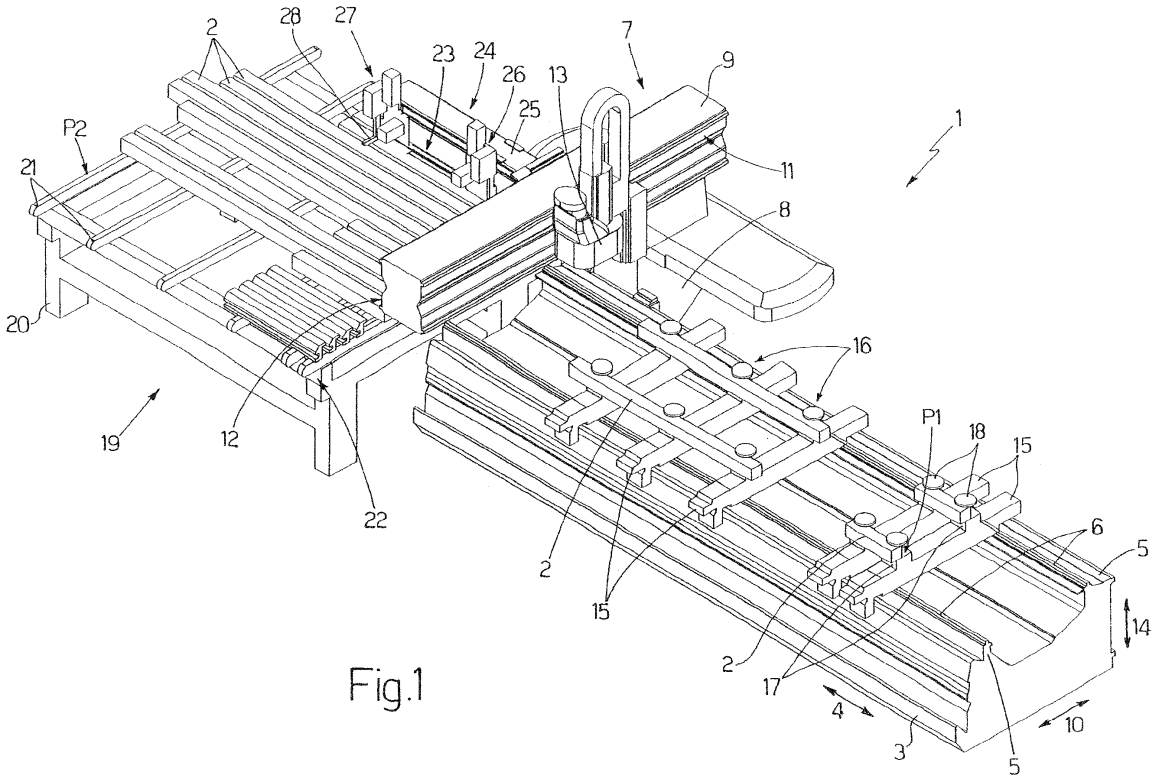

Fig.1

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Description

[0001] The present invention relates to a method of machining component parts of wood or similar, in particular door and window frame component parts.

[0002] Door and window frame component parts are known to be machined on a machine of the type comprising an elongated bed with two longitudinal guide members; a number of cross members fitted in sliding manner to the longitudinal members; at least one clamp fitted to each cross member to clamp the component parts for machining; a bridge movable along the bed in a first direction; and a machining head movable along the bridge in a second direction crosswise to the first.

[0003] The clamps are normally movable along the cross members in the second direction by means of respective actuating devices to machine the two opposite sides of each component part. In actual use, the component part is first clamped by at least one first clamp to enable the machining head to machine a first side of the component part, and is then gripped along the first side by at least one second clamp to remove the component part from the first clamp and enable the machining head to machine a second side of the component part.

[0004] Known machines of the above type for working component parts of wood or similar have several drawbacks, mainly due to comprising an actuating device for each clamp, which makes them relatively complicated and expensive.

[0005] It is an object of the present invention to provide a method of machining component parts of wood or similar, designed to eliminate the above drawbacks, and which is cheap and easy to implement.

[0006] According to the present invention, there is provided a method of machining component parts of wood or similar, as claimed in the accompanying Claims.

[0007] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view in perspective of a preferred embodiment of the machine according to the present invention;

Figure 2 shows a schematic side view of the Figure 1 machine;

Figure 3 shows, schematically, one operating mode of the Figure 1 and 2 machine;

Figure 4 shows a schematic side view of a variation of a first detail of the Figure 1 and 2 machine;

Figure 5 shows a schematic side view of a variation of a second detail of the Figure 1 and 2 machine.

[0008] Number 1 in Figure 1 indicates as a whole a machine for machining door and window frame component parts 2 of wood or similar, and which comprises an elongated, substantially U-shaped bed 3 extending in a horizontal direction 4 and having two lateral longitudinal members 5 extending parallel to direction 4 and each supporting a respective rail 6 also parallel to direction 4.

[0009] Machine 1 also comprises a bridge 7, in turn comprising an upright 8 which is fitted in known manner to bed 3, is moved linearly in direction 4 along bed 3 by a known actuating device not shown, and is fitted on its free end with a cross member 9 extending over bed 3 in a horizontal direction 10 crosswise to direction 4, and bounded laterally by two opposite faces 11, 12 substantially perpendicular to direction 4.

[0010] Bridge 7 supports a known machining head 13 which is fitted to face 11, is fitted in known manner to cross member 9 to move linearly along cross member 9 in direction 10, and comprises at least one tool spindle (not shown) fitted in known manner to head 13 to move in a vertical direction 14 perpendicular to directions 4 and 10.

[0011] Machine 1 also comprises a number of cross members 15 - hereinafter referred to as "work surfaces" - which extend between rails 6 in direction 10, and are fitted to rails 6 to slide manually, or by means of respective known actuating devices not shown, along rails 6 in direction 4.

[0012] Work surfaces 15 support a number of clamps 16, the arrangement of which on relative work surfaces 15 substantially depends on the size of, and the type of work to be carried out on, component parts 2.

[0013] In the example shown, each clamp 16 comprises a fixed bottom jaw 17 fixed to relative work surface 15 and defining, with jaws 17 of the other clamps 16, a substantially horizontal supporting surface P1 for at least one component part 2; and a movable top jaw 18 which extends parallel to surface P1, is fitted to the free end of an output rod (not shown) of an actuating cylinder (not shown), and is moved by the actuating cylinder (not shown) between a clamped position (Figure 1) and a release position respectively clamping and releasing component part 2.

[0014] Machine 1 also comprises a feed device 19 for component parts 2, which comprises a bed 20 located alongside bed 3 in direction 4 and supporting a number of belt conveyors 21, which are aligned in direction 4, extend in respective vertical planes parallel to one another and to direction 10, and have respective coplanar top conveying branches defining a horizontal conveying surface P2 parallel to surface P1.

[0015] Conveyors 21 extend in direction 10 between a loading station 22 where component parts 2 for machining are loaded onto device 19, and an unloading station 23 where component parts 2 for machining are unloaded off device 19.

[0016] Component parts 2 are transferred between clamps 16 and feed device 19 by a grip-and-carry assembly 24 comprising an arm 25, which projects in direction 4 from face 12 of cross member 9, is fitted in known manner to cross member 9 to move linearly along cross member 9 in direction 10 under the control of a known actuating device not shown, and is fitted, in the example shown, with two grip-and-carry device 26, 27

movable with respect to each other in direction 4.

[0017] In the example shown, device 26 is fixed to arm 25 in direction 4, while device 27 is fitted in known manner to arm 25 to move linearly along arm 25 in direction 4 under the control of a known actuating device not shown.

[0018] With reference to Figure 2, each device 26, 27 comprises a gripper, in turn comprising a substantially L-shaped bottom jaw 28 movable in direction 14 under the control of a known actuating device not shown; and a top jaw 29 which is fitted to the free end of an output rod 30 of an actuating cylinder 31 fixed to jaw 28, and is moved by actuating cylinder 31 between a grip position and a release position respectively gripping and releasing component part 2.

[0019] In actual use, component parts 2 are loaded successively onto device 19 at loading station 22, either manually or by means of a known loader not shown, are positioned contacting at least two known stops (not shown) located at station 22 to ensure each component part 2 is positioned correctly in direction 10, and are then fed successively in steps to unloading station 23.

[0020] Once component parts 2 are loaded onto feed device 19, the component part 2 located at station 23 is transferred by grip-and-carry assembly 24 to clamps 16 for machining by machining head 13, feed device 19 is operated to move another component part 2 into station 23, and the machined component part 2 is transferred by assembly 24 from clamps 16 to station 22.

[0021] The component part 2 unloaded at station 22 is then moved forward, behind the component parts 2 already unloaded at station 22 (Figure 2), by a push device (not shown) operated independently of feed device 19 when device 19 is stopped.

[0022] The above operating sequence is repeated for all the component parts 2 loaded onto device 19, so as to gradually replace the component parts 2 to be machined with the machined component parts 2.

[0023] In the Figure 3 operating mode, the component part 2 for machining is picked up from station 23 by assembly 24; is inserted by assembly 24 inside at least one first clamp 16 (hereinafter indicated 16a) in an insertion direction 10a parallel to direction 10 (Figure 3a) to enable machining head 13 to machine a first side 2a of component part 2 (Figure 3b); is withdrawn from clamp 16a by assembly 24 (Figure 3c); and is inserted by assembly 24 inside at least one second clamp 16 (hereinafter indicated 16b) in an insertion direction 10b parallel to and opposite direction 10a, to enable machining head 13 to machine a second side 2b, opposite side 2a, of component part 2 (Figure 3d).

[0024] Obviously, once side 2a is machined, component part 2 may be withdrawn from clamp 16a, moved in directions 10 and 14 onto the opposite side of clamp 16a, and inserted once more into the same clamp 16a in direction 10b to also machine side 2b.

[0025] As will be clear from the above description:

- component parts 2 being transferred between clamps 16a and 16b by grip-and-carry assembly 24, clamps 16 may be fixed to relative work surfaces 15 in direction 10, with no need for relative actuating devices in direction 10; and
- since feed device 19 provides for both feeding the components parts 2 for machining to grip-and-carry assembly 24, and receiving the machined component parts 2 from assembly 24, machine 1 is relatively compact and cheap.

[0026] In Figure 4, grip-and-carry devices 26, 27 are replaced by respective dual grip-and-carry devices 32, 33, each comprising a respective slide 34, which is movable in direction 14 and supports two superimposed grippers 35, 36, with gripper 35 located over gripper 36.

[0027] Gripper 35 comprises a bottom jaw 37 projecting in direction 10 from slide 34 and cooperating with a top jaw 38, which is movable in direction 14, with respect to slide 34 and under the control of an actuating cylinder 39 fixed to slide 34, between a grip position and a release position respectively gripping and releasing a first component part 2; and gripper 36 comprises a top jaw defined by bottom jaw 37 of gripper 35, and a bottom jaw 40, which is movable in direction 14, with respect to slide 34 and under the control of an actuating cylinder 41 fixed to slide 34, between a grip position and a release position respectively gripping and releasing a second component part 2.

[0028] Obviously, at least slide 34 of device 33 is in turn fitted to a slide (not shown) movable in direction 4 along arm 25.

[0029] In actual use, at each operating cycle, grip-and-carry assembly 24 in Figure 4 :

- removes a machined component part 2 from clamps 16, and releases a component part 2 for machining to clamps 16; and
- as each component part 2 is being machined, unloads the machined component part 2 at station 22, and picks up another component part 2 for machining from station 23.

[0030] In Figure 5, feed device 19 is replaced by two feed devices 42, which are identical to device 19, define two parallel, superimposed supporting surfaces P2, and are located one (hereinafter indicated 42a) over the other (hereinafter indicated 42b).

[0031] Device 42a extends between loading station 22 and unloading station 23, and successively feeds component parts 2 for machining from station 22 to station 23; and device 42b feeds the machined component part 2 from an input station 43, projecting beyond station 23 in direction 10, to an output station 44 opposite station 43 and located at station 22.

[0032] In the example shown, device 42b is associated with a lifting device 45 comprising a substantially vertical supporting beam 46 facing bed 20 of devices 42a, 42b in direction 10; and a number of arms 47, which project

from beam 46 in direction 10, are offset with respect to belt conveyors 21 of device 42b in direction 4, and define a supporting surface P3 for at least one machined component part 2.

[0033] Beam 46 is movable in direction 14 between a raised position, in which device 45 receives the machined component part 2 from assembly 24, and a lowered position, in which arms 47 are positioned between conveyors 21, and surface P3 is positioned below surface P2 of device 42b.

[0034] In actual use, component parts 2 for machining are fed successively by device 42a from loading station 22 to unloading station 23, are picked up successively at station 23 by assembly 24, are transferred to clamps 16, and are machined by head 13.

[0035] The machined component parts 2 are removed from clamps 16 by assembly 24, are released by assembly 24 onto surface P3 when device 45 is in the raised position, are lowered by device 45 at input station 43, are released by device 45 onto device 42b, and are fed by device 42b to output station 44.

[0036] Obviously, in a variation not shown, lifting device 45 may be eliminated, and the machined component parts 2 released directly by assembly 24 at input station 43 of device 42b.

[0037] In connection with the above, it should be pointed out component parts 2 for machining may be loaded onto device 42a at station 22, and the machined component parts 2 unloaded off device 42b at station 44 either manually or automatically by means of respective feed devices, possibly associated with further machines identical to machine 1.

[0038] In a variation not shown, bridge 7 supports machining head 13 only, and grip-and-carry assembly 24 is fitted to a further bridge identical to bridge 7.

Claims

1. A method of machining component parts (2) of wood or similar, in particular component parts (2) of door and window frames, on a machine comprising a bed (3) extending in a first direction (4); at least two cross members (15) movable along the bed (3) in the first direction (4); at least one clamp (16) fitted to each cross member (15) to clamp at least one component part (2) for machining; a bridge (7) movable along the bed (3) in the first direction (4) and having at least one machining head (13) movable along the bridge (7) in a second direction (10) crosswise to the first direction (4); a feed device (19) for feeding the component parts (2) in steps between a loading station (22) where the component parts (2) for machining are loaded onto the feed device (19), and an unloading station (23) where the component parts (2) for machining are unloaded off the feed device (19); and a grip-and-carry assembly (24) for gripping and carrying the component parts (2), and which is movable in said first and second direction (4, 10); the method comprising the steps of:

   transferring at least one component part (2) for machining from the unloading station (23) to at least one clamp (16) by means of the grip-and-carry assembly (24);
   machining the component part (2); and
   feeding another component part (2) for machining into the unloading station (23);
   the method being **characterized by** also comprising the step of:

      transferring the machined component part (2) from the clamp (16) to the loading station (22) by means of the grip-and-carry assembly (24).

2. A method as claimed in Claim 1, and also comprising the steps of:

   inserting, by means of the grip-and-carry assembly (24), the component part (2) for machining into at least one clamp (16) in a first insertion direction (10a);
   machining a first side (2a) of the component part (2);
   removing the component part (2) from the clamp (16) by means of the grip-and-carry assembly (24);
   inserting the component part (2), by means of the grip-and-carry assembly (24), into at least one clamp (16) in a second insertion direction (10b) opposite the first insertion direction (10a); and
   machining a second side (2b), opposite the first side (2a), of the component part (2).

3. A method as claimed in Claim 2, wherein the first side (2a) is machined inside at least one clamp (16a), and the second side (2b) is machined inside the same clamp (16a).

4. A method as claimed in Claim 2, wherein the first side (2a) is machined inside at least a first clamp (16a), and the second side (2b) is machined inside at least a second clamp (16b) different from the first clamp (16a).

5. A method as claimed in any one of the preceding Claims, wherein the grip-and-carry assembly (24) comprises at least two grip-and-carry devices (26, 27; 32, 33), each for receiving a relative component part (2); the method also comprising the steps of:

   removing a machined component part (2) from at least one clamp (16) by means of a first said grip-and-carry device (26; 32);

inserting a component part (2) for machining into at least one clamp (16) by means of a second said grip-and-carry device (27; 33); and
transferring the machined component part (2) to the loading station (22) by means of the first grip-and-carry device (26; 32).

6. A method as claimed in Claim 5, wherein the grip-and-carry devices (32, 33) are arranged to define two substantially parallel, superimposed supporting surfaces.

7. A method as claimed in any one of the preceding Claims, wherein the grip-and-carry assembly (24) comprises a supporting arm (25) extending in the first direction (4); and at least two grip-and-carry devices (26, 27; 32, 33) movable along the supporting arm (25) in the first direction (4); the method also comprising the step of:

selectively controlling the position of the two grip-and-carry devices (26, 27; 32, 33) with respect to each other in said first direction (4).

8. A method as claimed in any one of the preceding Claims, wherein the clamps (16) are fixed in said second direction (10).

9. A method of machining component parts (2) of wood or similar, in particular component parts (2) of door and window frames, on a machine comprising a bed (3) extending in a first direction (4); at least two cross members (15) movable along the bed (3) in the first direction (4); at least one clamp (16) fitted to each cross member (15) to clamp at least one component part (2) for machining; a bridge (7) movable along the bed (3) in the first direction (4) and having at least one machining head (13) movable along the bridge (7) in a second direction (10) crosswise to the first direction (4); a first feed device (42a) for feeding the component parts (2) in steps between a loading station (22) where the component parts (2) for machining are loaded onto the feed device (42a), and an unloading station (23) where the component parts (2) for machining are unloaded off the feed device (42a); and a grip-and-carry assembly (24) for gripping and carrying the component parts (2), and which is movable in said first and second direction (4, 10); the method comprising the steps of:

transferring at least one component part (2) for machining from the unloading station (23) to at least one clamp (16) by means of the grip-and-carry assembly (24); and
machining the component part (2);
and the method being **characterized by** also comprising the step of:

transferring the machined component part (2) from the clamp (16) to an input station (43) of a second feed device (42b) parallel to and superimposed with the first feed device (42a).

10. A method as claimed in Claim 9, wherein the first feed device (42a) is located over the second feed device (42b).

11. A method as claimed in Claim 9 or 10, and also comprising the step of:

transferring the machined component part (2) from the clamp (16) to the input station (43) by means of the grip-and-carry assembly (24).

12. A method as claimed in Claim 9 or 10, and also comprising the steps of:

transferring the machined component part (2) from the clamp (16) to a lifting device (45) by means of the grip-and-carry assembly (24); and
transferring the machined component part (2) to the input station (43) by means of the lifting device (45).

13. A method as claimed in Claim 12, and also comprising the step of moving the lifting device (45) to and from a work position, in which the lifting device (45) is substantially coplanar with the second feed device (42b).

14. A method as claimed in any one of Claims 9 to 13, wherein the second feed device (42b) extends between the input station (43) and an output station (44); the method also comprising the step of feeding the machined component part (2) from the input station (43) to the output station (44) in a first direction (10) parallel to and opposite a second direction (10) in which the component part (2) for machining is fed from the loading station (22) to the unloading station (23).

15. A method as claimed in any one of Claims 9 to 14, and also comprising the steps of manually loading the component parts (2) for machining at the loading station (22), and manually unloading the machined component parts (2) at the output station (44).

16. A method as claimed in any one of Claims 9 to 14, and also comprising the steps of loading the component parts (2) for machining at the loading station (22), and unloading the machined component parts (2) at the output station (44) by means of automatic feed means.

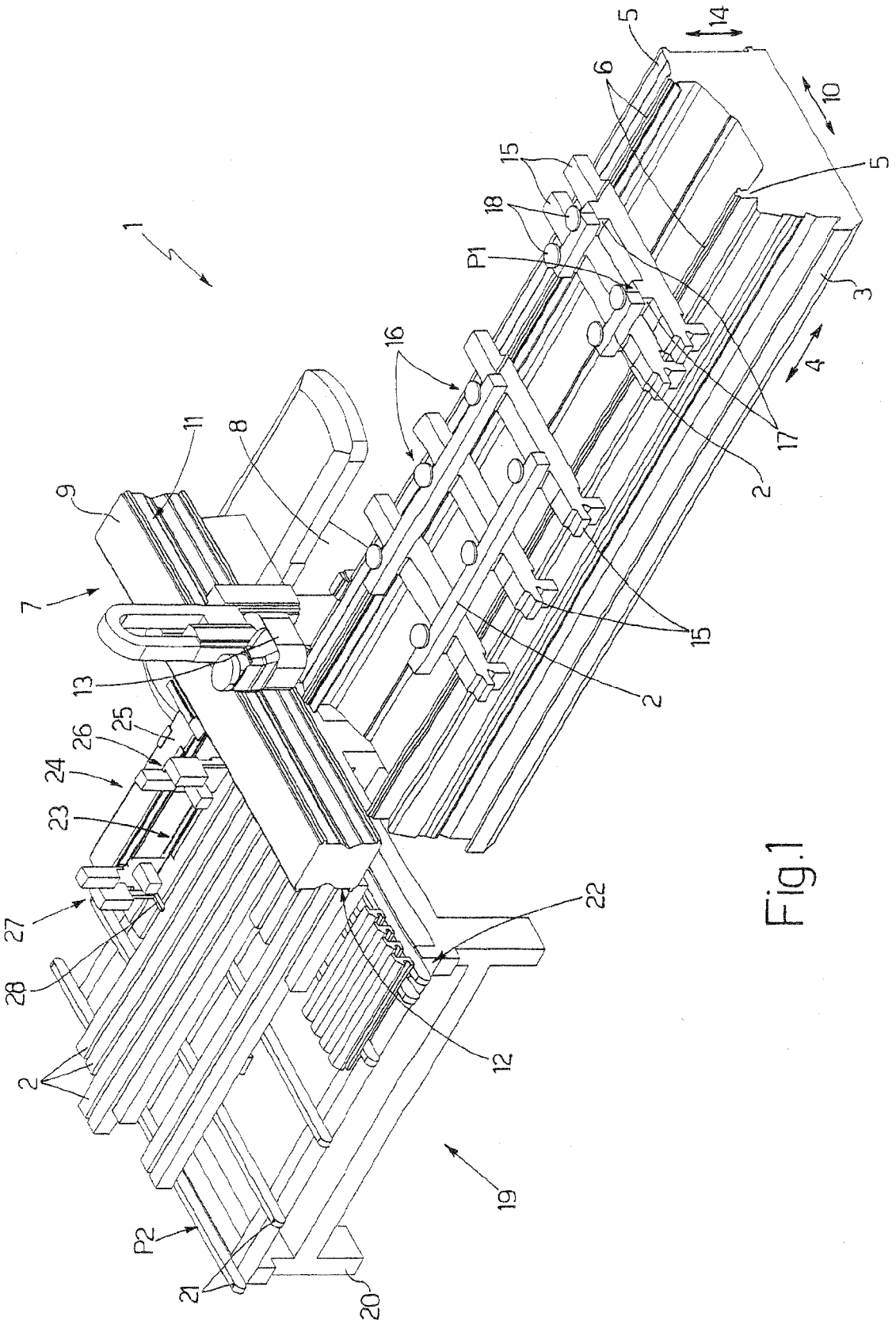
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Fig.1

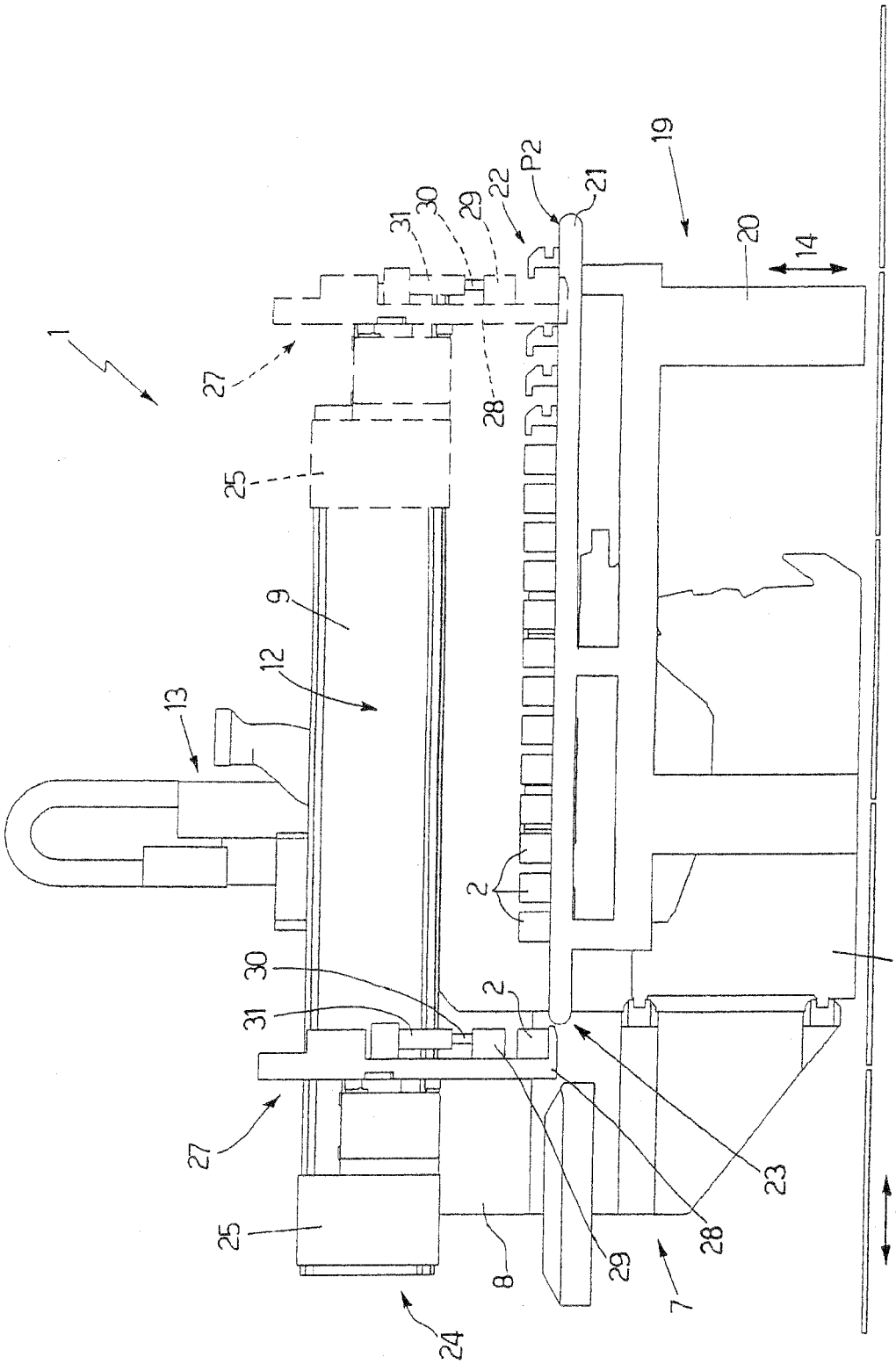
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Fig.2

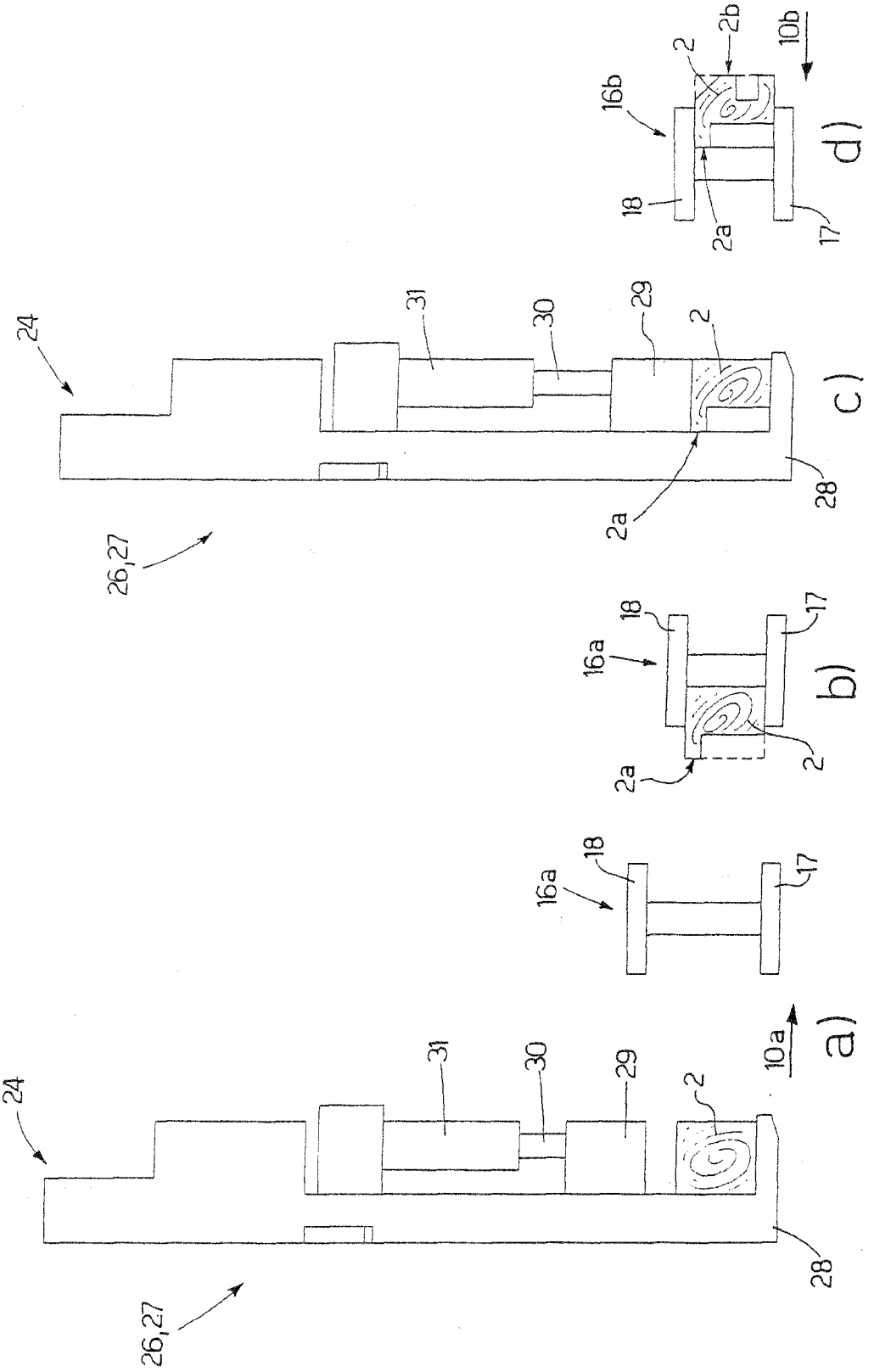

Fig.3

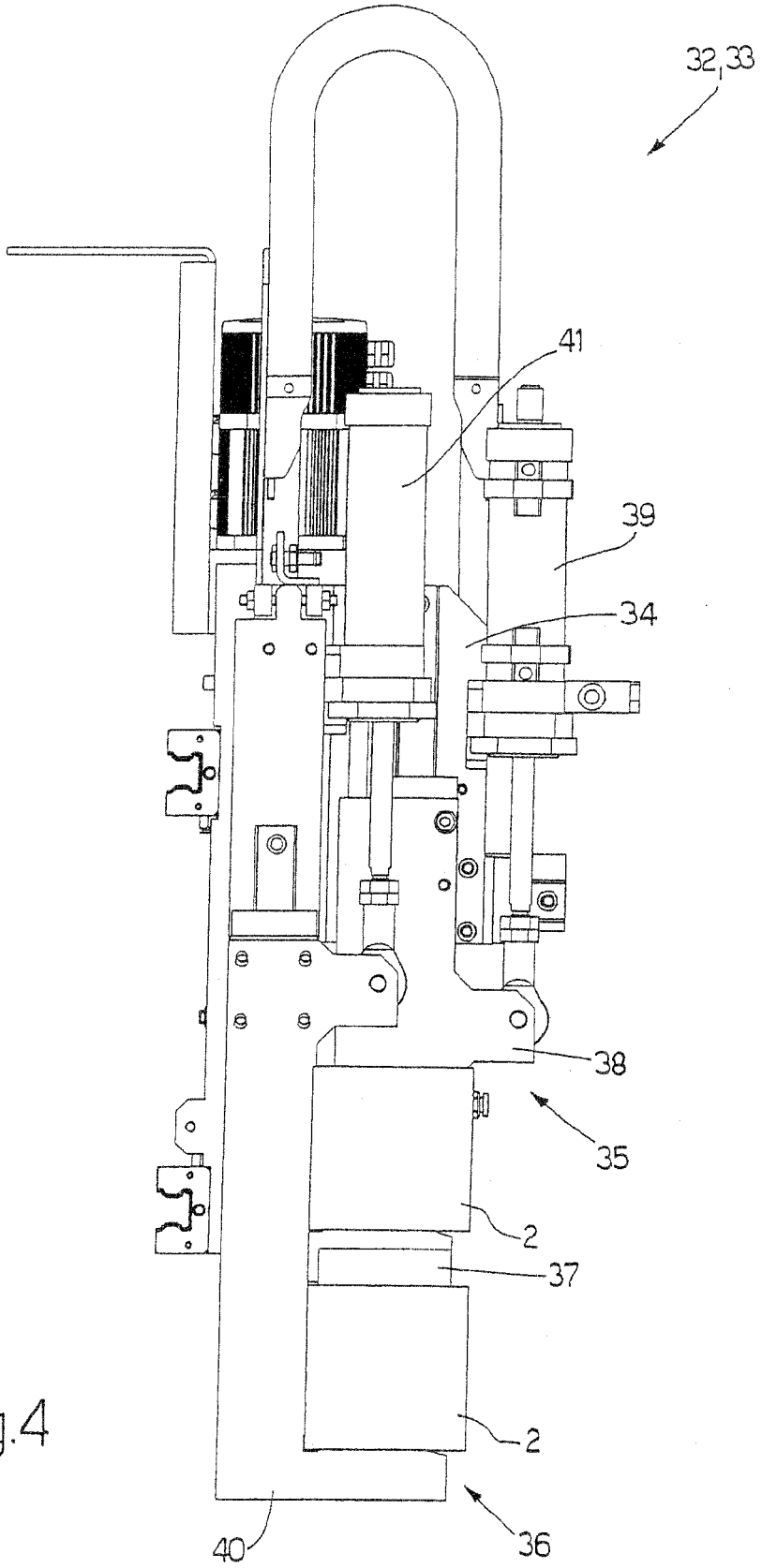

Fig.4

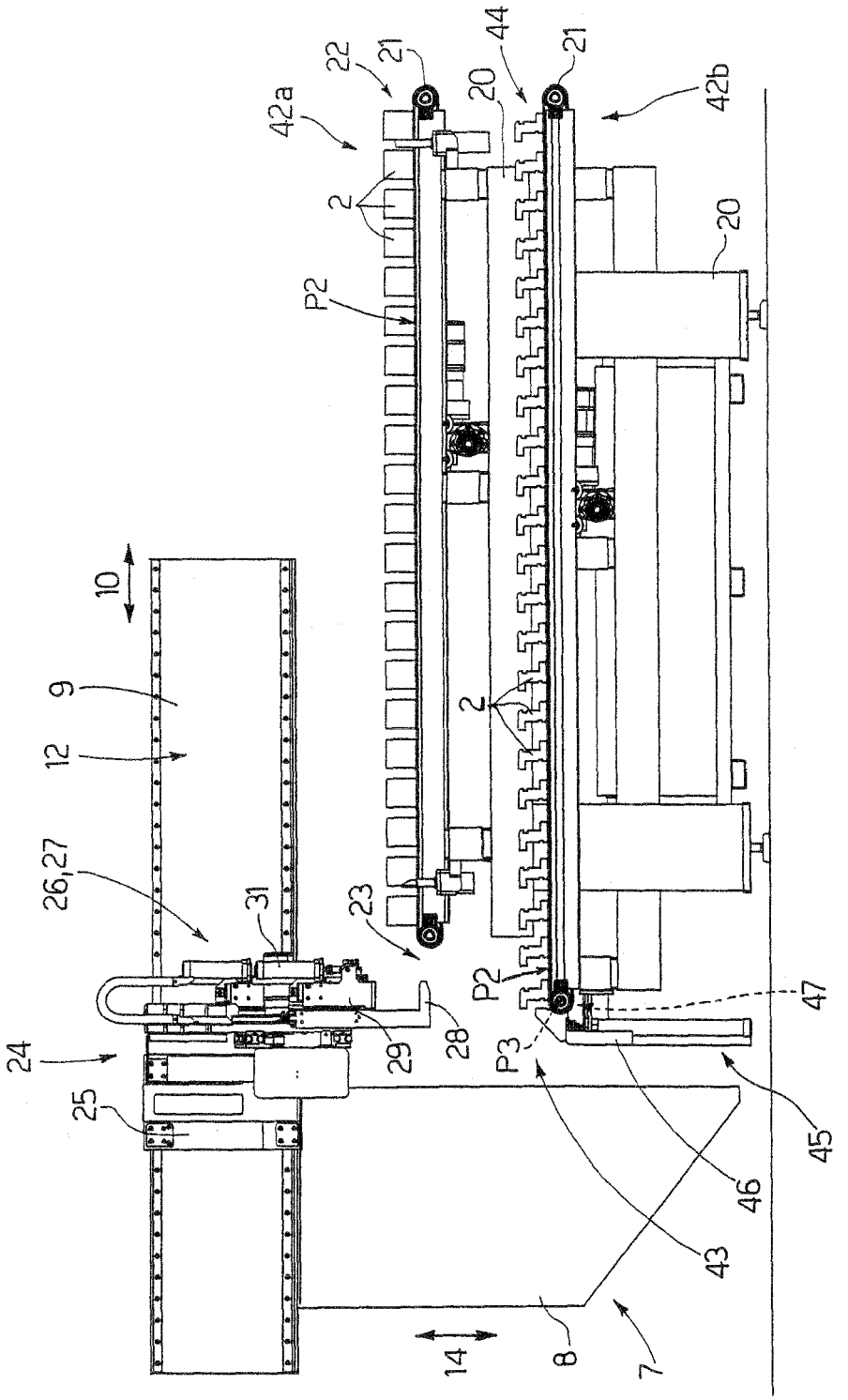
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Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 10 17 2236

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 894 565 A2 (GUENTERT ENGELBERT [DE]) 3 February 1999 (1999-02-03) * paragraph [0018] * * paragraph [0036] * * figure *	1,9	INV. B27M1/08 B27F1/04 B23Q7/04
A	DE 20 2004 005893 U1 (CELASCHI S P A [IT]) 9 June 2004 (2004-06-09) * paragraph [0017] * * paragraph [0047] * * figures 13-18 *	1,9	
A	EP 0 724 939 A1 (HUNDEGGER HANS [DE]) 7 August 1996 (1996-08-07)	1,9	
A	DE 100 30 997 A1 (BIESSE SPA [IT]) 11 January 2001 (2001-01-11)	1,9	

TECHNICAL FIELDS SEARCHED (IPC)

B27M
B27F
B23Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 August 2010	Huggins, Jonathan

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19-08-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0894565 A2	03-02-1999	DE 19733457 C1	07-01-1999
DE 202004005893 U1	09-06-2004	NONE	
EP 0724939 A1	07-08-1996	AT 181275 T	15-07-1999
		DE 19503731 A1	08-08-1996
DE 10030997 A1	11-01-2001	IT BO990363 A1	02-01-2001

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