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(54) **Trimming-scraping unit for finishing components of wood or similar**

(57) A component (2) of wood or similar, defined by a panel (3) and by an edging strip (6) glued along at least part of a lateral edge (5) of the panel (3), is finished by means of a trimming-scraping unit having a pair of trimming tools (34) for trimming the edging strip (6), a pair of edging strip scraping tools (44) for scraping the edging strip (6), and a pair of glue scraping tools (50) for scraping off any leftover glue; the trimming tools (34), edging strip scraping tools (44), and glue scraping tools (50) all being housed simultaneously inside a supporting frame (9) of the trimming-scraping unit.

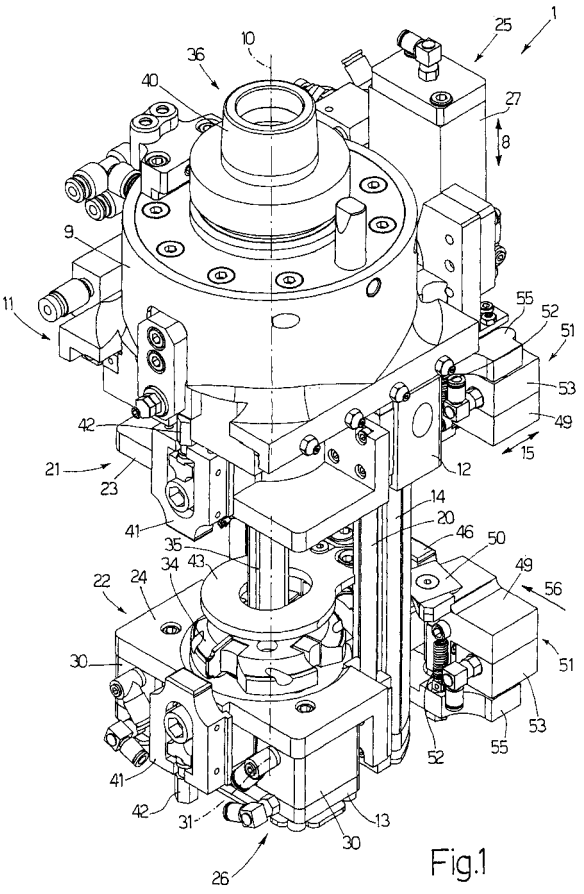

Fig.1

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Description

[0001] The present invention relates to a trimming-scraping unit for finishing components of wood or similar.

[0002] More specifically, the present invention relates to a trimming-scraping unit for finishing components of wood or similar, each of which comprises a panel of wood or similar, and an edging strip glued along at least part of a lateral edge of the panel.

[0003] A trimming-scraping unit is locked axially to a tool spindle of a machining centre, and normally comprises a supporting frame, a pair of trimming tools fitted to the supporting frame to trim the edging strip, and a pair of edging strip scraping tools fitted to the supporting frame to scrape the trimmed edging strip.

[0004] Once the edging strip is scraped, the two edging strip scraping tools are replaced with a pair of glue scraping tools, which are fitted to the supporting frame to scrape off any leftover glue and so finish the component.

[0005] Known trimming-scraping units of the type described above have several drawbacks, mainly due to replacement of the edging strip scraping tools with the glue scraping tools involving a good deal of time and so reducing the output of the unit.

[0006] It is an object of the present invention to provide a trimming-scraping unit for finishing components of wood or similar, designed to eliminate the aforementioned drawbacks, and which is cheap and easy to implement.

[0007] According to the present invention, there is provided a trimming-scraping unit for finishing components of wood or similar, as claimed in the accompanying Claims.

[0008] 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 trimming-scraping unit according to the present invention;

Figure 2 shows a schematic side view of the Figure 1 trimming-scraping unit;

Figure 3 shows a schematic longitudinal section of the Figure 1 trimming-scraping unit;

Figure 4 shows schematics of the operating cycle of the Figure 1 trimming-scraping unit.

[0009] With reference to Figures 1 and 4a, number 1 indicates as a whole a trimming-scraping unit for finishing components 2 of wood or similar. In the example shown, each component 2 comprises a substantially flat, substantially parallelepiped-shaped panel 3 bounded by two parallel major lateral faces 4 and by a lateral edge 5 substantially crosswise to faces 4; and an edging strip 6 glued along at least part of edge 5 and having two opposite longitudinal edges 7 projecting from faces 4 in a vertical direction 8 perpendicular to faces 4.

[0010] As shown in Figures 1 and 3, unit 1 comprises a tubular frame 9 having a longitudinal axis 10 parallel to direction 8, and supporting a transverse slide 11, which comprises two plates 12, 13 - plate 12 located over plate 13 - extending perpendicularly to direction 8 and connected to each other by two uprights 14 substantially parallel to direction 8.

[0011] Slide 11 is fitted in sliding manner to frame 9 - to move linearly, with respect to frame 9 and as explained below, in a horizontal direction 15 crosswise to direction 8 - by means of a damping device 16 comprising two coupling pins 17, which are fixed to frame 9 on opposite sides of plate 12 in direction 15, extend parallel to direction 15, and engage in sliding manner respective cavities 18 formed in plate 12, with the interposition of respective springs 19 housed inside cavities 18.

[0012] Uprights 14 are fitted with respective rails 20 extending parallel to direction 8 and supporting two longitudinal slides 21, 22. Slide 21 is located over slide 22, and each comprises a respective plate 23, 24 fitted in sliding manner to rails 20 and moved linearly in direction 8 along rails 20 by a respective actuating device 25, 26.

[0013] With reference to Figure 3, device 25 comprises an actuating cylinder 27 fixed to top plate 12 of slide 11 and having an output rod 28, which extends, parallel to direction 8, through a bottom wall of cylinder 27, and is connected to plate 23 with the interposition of a connecting bracket 29.

[0014] As shown in Figure 1, device 26 comprises two actuating cylinders 30 fixed to bottom plate 13 of slide 11 and having respective output rods (not shown), which extend parallel to direction 8 and support plate 24.

[0015] Each plate 23, 24 has a central hole, which is formed through plate 23, 24, parallel to direction 8, has a longitudinal axis 31 coincident with the longitudinal axis of the central hole of the other plate 23, 24, and is engaged in rotary and axially fixed manner, with the interposition of a rolling bearing 32, by a tubular sleeve 33 fitted with a known trimming tool 34 mounted coaxially with axis 31 to trim a relative longitudinal edge 7 of edging strip 6.

[0016] The two sleeves 33 are connected in sliding and angularly fixed manner by respective splined couplings to a first transmission shaft 35 rotated about axis 31 by a second transmission shaft 36, which extends through frame 9, coaxially with axis 10, is fitted in rotary and axially fixed manner to frame 9 with the interposition of two rolling bearings 37, and comprises a bottom shank 38 projecting downwards from frame 9 and connected in angularly fixed manner to a top end of shaft 35 by a known joint 39, which allows shaft 35 to move linearly in direction 15 with respect to shaft 36 and under the control of slide 11.

[0017] Shaft 36 has a substantially truncated-cone-shaped top shank 40 projecting upwards from frame 9 to engage a tool spindle (not shown) of a machining centre (not shown) which rotates shaft 36, and therefore shaft 35, about respective axes 10 and 31.

[0018] The two trimming tools 34 are associated with

two known vertical tracers 41, which are each mounted on one of slides 21, 22, are aligned with each other in direction 8, are located, in use, on opposite sides of work component 2 in direction 8, and engage faces 4 of component 2. In this connection, it should be pointed out that the thrust exerted on tracers 41 and, hence, on slides 21, 22 by component 2 substantially equals the thrust exerted on slides 21, 22 by relative actuating devices 25, 26, so that trimming tools 34 correctly follow the contour of faces 4 of work component 2.

[0019] Each tracer 41 is fitted in sliding manner to relative plate 23, 24 to move linearly in direction 8 with respect to relative plate 23, 24 and under the control of an adjusting screw 42 engaging relative plate 23, 24, so as to selectively control the position of tracer 41 when setting up unit 1.

[0020] The two trimming tools 34 are also associated with a known front tracer 43, which extends about shaft 35, is fitted in axially fixed manner to uprights 14 in direction 8, and engages edge 5 of work component 2. In this connection, it should be pointed out that the thrust exerted on tracer 43 and, hence, on slide 11 by component 2 substantially equals the thrust exerted on slide 11 by springs 19, so that trimming tools 34 correctly follow the contour of edge 5 of work component 2.

[0021] Tracer 43 is fitted in sliding manner to uprights 14 to move linearly in direction 15 with respect to uprights 14, so as to selectively control the position of tracer 43 when setting up unit 1.

[0022] Plates 23, 24 also support respective known edging strip scraping tools 44, which are fixed to relative plates 23, 24 to scrape the longitudinal edges 7 of edging strip 6 trimmed by trimming tools 34, and are associated with a known front tracer 45, which is coplanar with tracer 43, is fitted in axially fixed manner to uprights 14 in direction 8, and engages edge 5 of work component 2. In this connection, it should be pointed out that the thrust exerted on tracer 45 and, hence, on slide 11 by component 2 substantially equals the thrust exerted on slide 11 by springs 19, so that edging strip scraping tools 44 correctly follow the contour of edge 5 of work component 2.

[0023] Tracer 45 is fitted in sliding manner to uprights 14 to move linearly in direction 15 with respect to uprights 14, so as to selectively control the position of tracer 45 when setting up unit 1.

[0024] The two edging strip scraping tools 44 are associated with two known vertical tracers 46, which are each mounted on one of slides 21, 22, are aligned with each other in direction 8, are located, in use, on opposite sides of work component 2 in direction 8, and engage faces 4 of component 2. In this connection, it should be pointed out that the thrust exerted on tracers 46 and, hence, on slides 21, 22 by component 2 substantially equals the thrust exerted on slides 21, 22 by relative actuating devices 25, 26, so that edging strip scraping tools 44 correctly follow the contour of faces 4 of work component 2.

[0025] Each tracer 46 is fitted in sliding manner to relative plate 23, 24 to move linearly in direction 8 with respect to relative plate 23, 24 and under the control of an adjusting screw 47 engaging relative plate 23, 24, so as to selectively control the position of tracer 46 when setting up unit 1.

[0026] As shown in Figure 2, a lateral face of each tracer 46 is fitted with a rail 48 extending parallel to direction 8 and supporting a slide 49, which is fitted in sliding manner to relative tracer 46 and has a known glue scraping tool 50 for scraping off any leftover glue on component 2.

[0027] Slide 49 is movable in direction 8, with respect to tracer 46 and under the control of an actuating device 51, between a rest position (shown by the continuous line in Figure 2), in which glue scraping tool 50 is located a given distance from component 2, and a work position (shown by the dash line in Figure 2), in which glue scraping tool 50 engages component 2 to scrape off the glue.

[0028] Device 51 comprises a spring 52 interposed between tracer 46 and slide 49 to hold slide 49 normally in the rest position; and an actuating cylinder 53 fixed to slide 49 and having an output rod 54, which extends parallel to direction 8 and engages a bracket 55 projecting laterally from tracer 46 to move slide 49 into the work position in opposition to spring 52.

[0029] Operation of unit 1 will now be described with reference to Figure 4, and as of the instant in which slides 21 and 22 have been moved with respect to each other so that trimming tools 34 engage longitudinal edges 7 of edging strip 6, vertical tracers 41 engage faces 4 of component 2, and front tracer 43 engages edging strip 6 and, hence, edge 5.

[0030] By combining the movements of unit 1 in a direction 56 parallel to edging strip 6, with rotation of trimming tools 34 about axis 31, edges 7 are trimmed (Figures 4b and 4c) by a machining operation. At this point, trimming tools 34, vertical tracers 41, and front tracer 43 are disengaged from component 2, and unit 1 is moved so that edging strip scraping tools 44 engage edges 7, vertical tracers 46 engage faces 4 of component 2, and front tracer 45 engages edging strip 6 and, hence, edge 5.

[0031] Unit 1 is then moved along edging strip 6 in direction 56 to first finish edges 7 by means of edging strip scraping tools 44, and then remove any leftover glue by means of glue scraping tools 50 (Figures 4d and 4e), which are moved into the work positions to engage faces 4 directly and avoid jamming against edge 5.

[0032] Unit 1 has several advantages, mainly due to the fact that:

- frame 9 simultaneously supports three distinct pairs of tools, i.e. trimming tools 34, edging strip scraping tools 44, and glue scraping tools 50, so that each operation is performed using the right tools, with no tool-change involved;
- each glue scraping tool 50 is located in series with and behind relative edging strip scraping tool 44 in direction 56, so as to finish component 2 in one pass

of unit 1 along edging strip 6; and
operation of actuating cylinders 53 is controlled selectively by an electronic central control unit (not shown) so as to move glue scraping tools 50 selectively into the work positions and, in particular, prevent them from jamming against edge 5 of component 2.

Claims

1. A trimming-scraping unit for finishing components (2) of wood or similar, each of which comprises a panel (3) of wood or similar, and an edging strip (6) glued along at least part of a lateral edge (5) of the panel (3), the trimming-scraping unit comprising connecting means (40) for locking the trimming-scraping unit axially to a tool spindle of a machining centre; a supporting frame (9); a pair of trimming tools (34) housed in the supporting frame (9) to trim said edging strip (6); and a pair of edging strip scraping tools (44) housed in the supporting frame (9) to scrape the trimmed edging strip (6); and being **characterized by** also comprising a pair of glue scraping tools (50) housed in the supporting frame (9) to scrape off any leftover glue; the supporting frame (9) being designed to simultaneously house said trimming tools (34), said edging strip scraping tools (44), and said glue scraping tools (50).

2. A trimming-scraping unit as claimed in Claim 1, wherein each said glue scraping tool (50) is mounted in series with a relative said edging strip scraping tool (44) in a travelling direction (56) of the trimming-scraping unit, so as to perform both the scraping operations in one pass of the trimming-scraping unit along said edging strip (6).

3. A trimming-scraping unit as claimed in Claim 1 or 2, and also comprising actuating means (51) for moving the glue scraping tools (50), with respect to each other, between a work position, in which the glue scraping tools (50) engage the work component (2), and a rest position, in which the glue scraping tools (50) disengage the work component (2).

4. A trimming-scraping unit as claimed in Claim 3, and also comprising electronic control means for selectively controlling operation of said actuating means (51) and, hence, movement of the glue scraping tools (50) into said work position.

5. A trimming-scraping unit as claimed in Claim 3 or 4, and also comprising two supporting slides (21, 22), each of which supports a relative said edging strip scraping tool (44), and is movable with respect to the other supporting slide (21, 22) to selectively control the position of the edging strip scraping tools (44) as a function of a thickness of the work component (2); each said glue scraping tool (50) being fitted to a relative said supporting slide (21, 22) to move, with respect to the relative supporting slide (21, 22) and under the control of said actuating means (51), between said work position and said rest position.

6. A trimming-scraping unit as claimed in any one of the foregoing Claims, and also comprising a pair of first vertical tracers (41) and a first front tracer (43), so that said trimming tools (34) correctly follow the contour of the work component (2).

7. A trimming-scraping unit as claimed in any one of the foregoing Claims, and also comprising a pair of second vertical tracers (46) and a second front tracer (45), so that said edging strip scraping tools (44) and said glue scraping tools (50) correctly follow the contour of the work component (2).

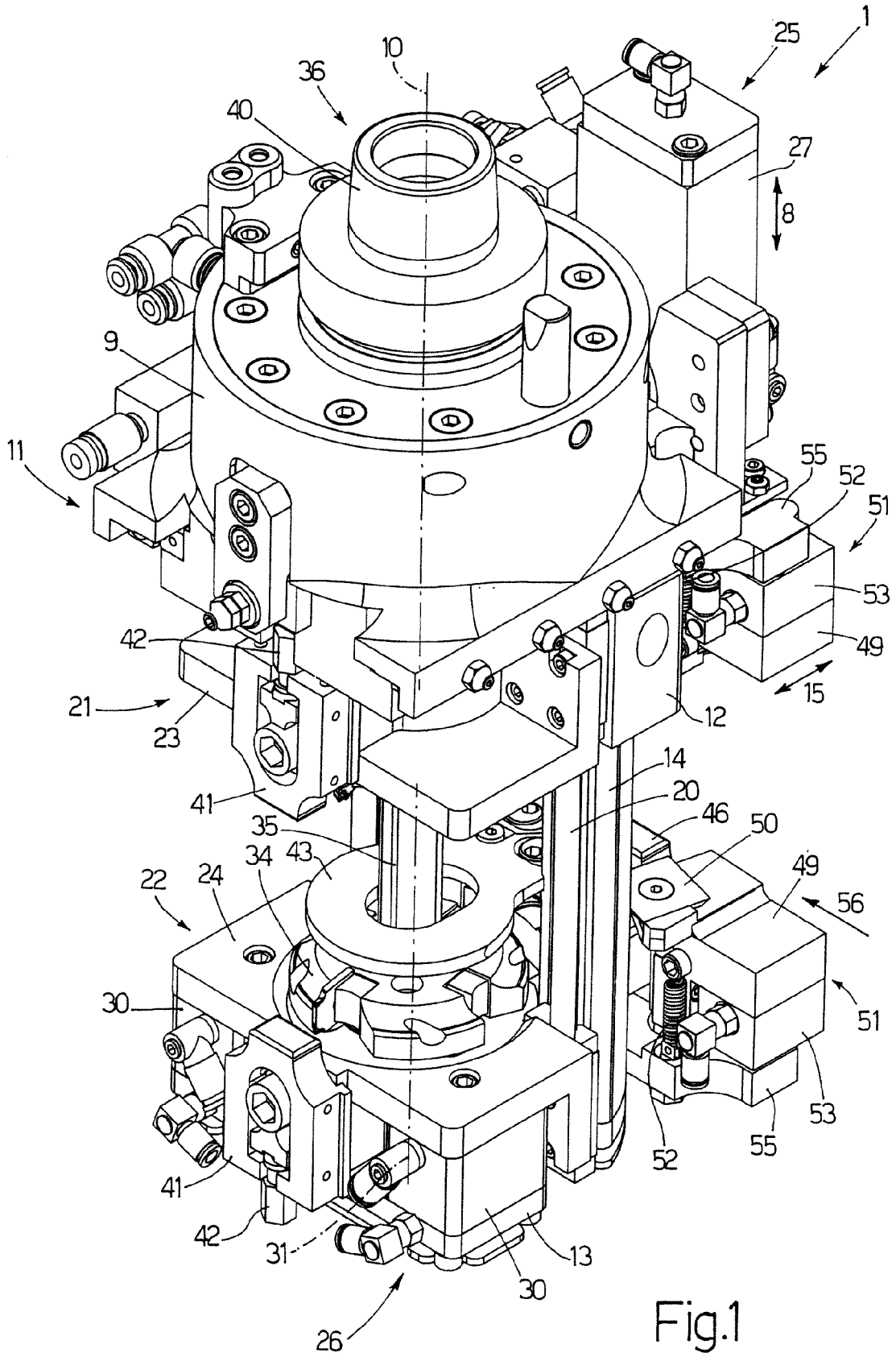
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Fig.1

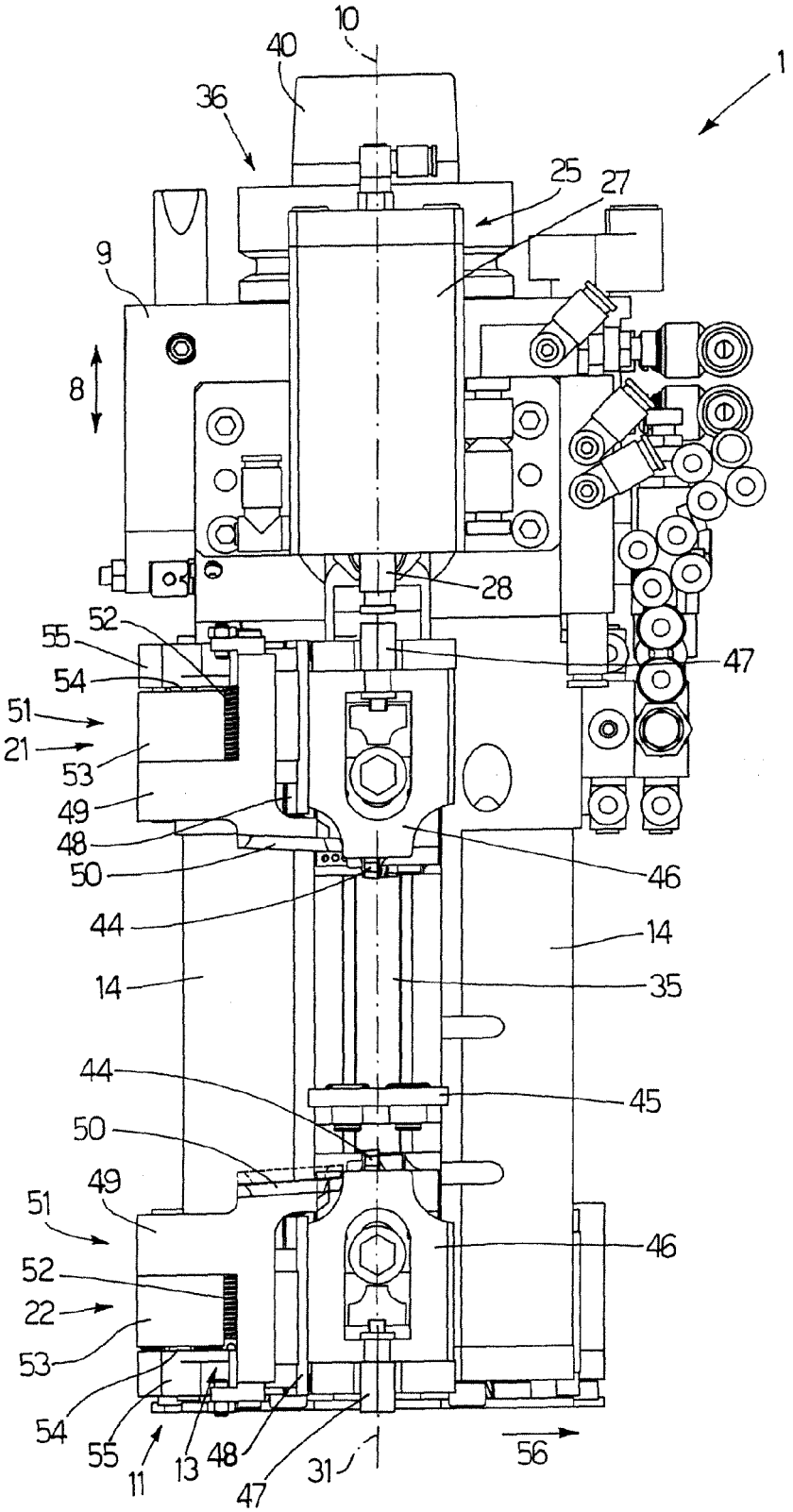
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Fig.2

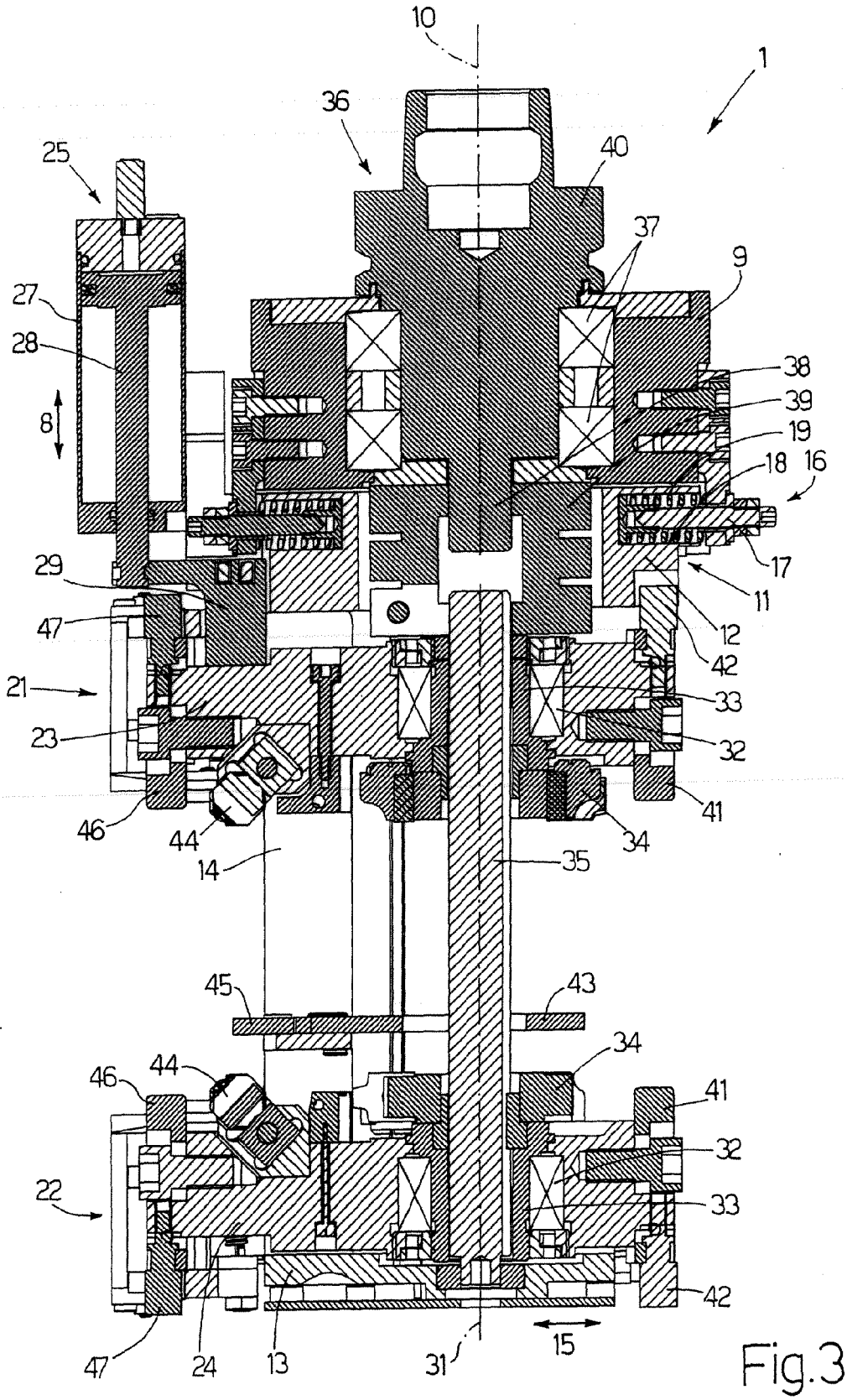
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Fig.3

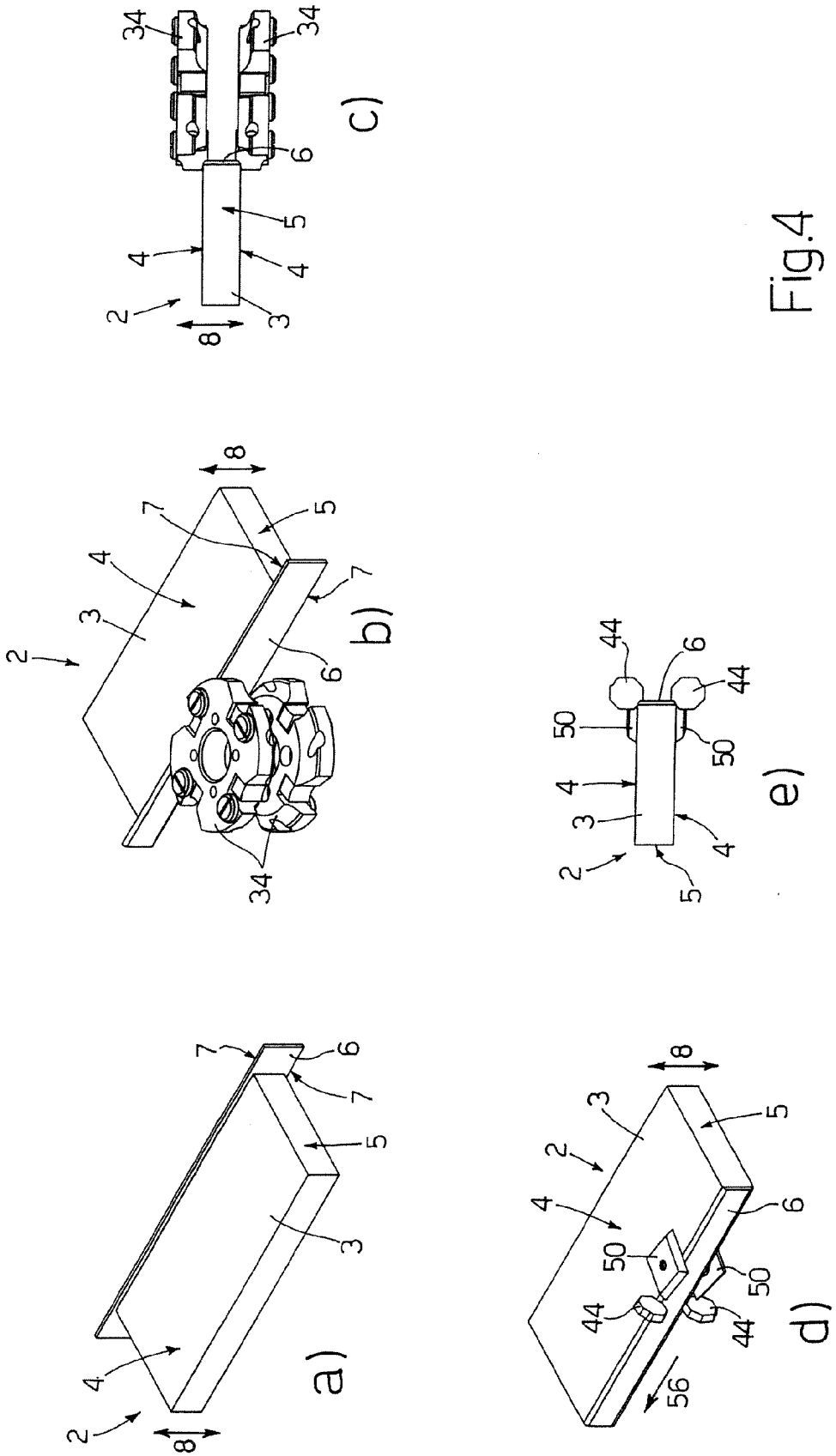

Fig.4