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(54) MACHINE FOR LABELLING WORKPIECES

(57) Described is a machine for labelling workpieces (1, 101) comprising: a bearing plane (2, 102) for bearing at least one workpiece (P, P') to be labelled; a label generation device (9, 109) for generating at least one label, said label generation device (9, 109) being placed above said bearing plane (2, 102); and an applying device (12, 120) for applying said at least one label on said at least one workpiece (P, P'). Said label generation device (9, 109) and said applying device (12, 120) are movable relative to each other to allow the transfer of said at least one label from said label generation device (9, 109) to said applying device (12, 120). Said applying device (12, 120) and said at least one workpiece (P, P') are movable relative to each other to allow the transfer of said at least one label from said applying device (12, 120) to said at least one workpiece (P, P'). Also described is a method for applying at least one label on at least one workpiece by means of the above-mentioned machine for labelling workpieces (1, 101).

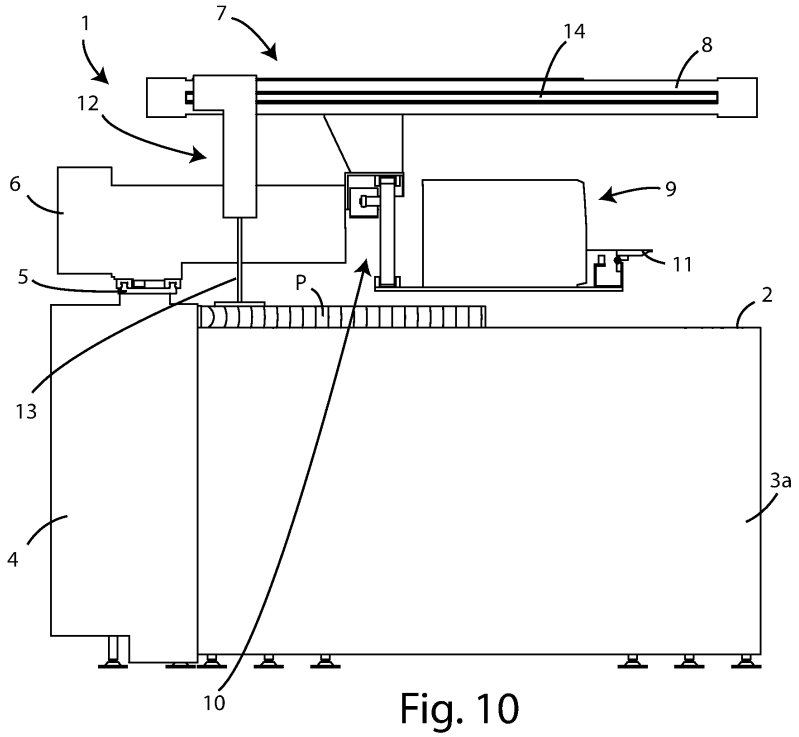

Fig. 10

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Description

[0001] This invention relates to a machine for labelling workpieces.

[0002] More in detail, the invention relates to a labelling machine designed and made in particular for applying label on wooden panels, but which can also be conveniently used for applying labels on workpieces of different type and shape.

[0003] The description below relates to a machine for labelling wooden panels, but it is quite apparent how the same should not be considered limited to this specific use, as it may also be advantageously used in the labelling of other workpieces.

[0004] There are prior art machines for labelling panels in which there is a bearing plane for the panels to be processed, which are normally positioned one above the other to form a stack of panels.

[0005] These machines also comprise an inverted "L" shaped support movable, along a first axis, on a linear guide positioned outside the bearing plane, in such a way that the supporting portion which protrudes sideways can move above the panels.

[0006] A printer, that is to say, a device for generating labels, is rigidly mounted on the vertical portion of the support, which extends vertically outside the bearing plane.

[0007] On the horizontal portion of the same support there is, on the other hand, a pad for applying labels on the panels, movable along a second axis orthogonal to the above-mentioned first axis in such a way that the pad can move above the bearing plane.

[0008] In this case, to allow the labelling of the panels, the pad moves towards the printer to pick up the label from the printer, and then position itself above the bearing plane to apply, from above, the label on the panel.

[0009] These machines show a series of limitations linked mainly with the long duration of the relative work cycles, that is, excessively long labelling operation execution times.

[0010] According to a second type of machine for labelling panels, a device for the generation and application of the labels can move above the bearing plane thanks to a system for the relative movement.

[0011] This second type of machine generally presents problems in the step for applying the labels due to the fact that these labels generally have quite large overall sizes which do not allow a complete and adequate adhesion of the labels on the panels, which are almost never perfectly planar, having, in reality, various undulations.

[0012] In light of the above, the aim of the invention is therefore to provide a machine for labelling workpieces which is able to quickly perform the labelling operations.

[0013] Another aim of the invention is to provide a machine for labelling workpieces which is such as to allow a correct application of the labels on the workpieces.

[0014] Another aim of the invention is to provide a machine for labelling workpieces which has a reduced structural complexity.

[0015] The specific object of the invention is therefore is a machine for labelling workpieces comprising: a bearing plane for bearing at least one workpiece to be labelled; a label generation device for generating at least one label, said label generation device being placed above said bearing plane; and an applying device for applying said at least one label on said at least one workpiece; wherein said label generation device and said applying device are movable relative to each other to allow the transfer of said at least one label from said label generation device to said applying device, and wherein said applying device and said at least one workpiece are movable relative to each other to allow the transfer of said at least one label from said applying device to said at least one workpiece.

[0016] Preferably according to the invention, said label generation device and said applying device are both movable relative to bearing plane.

[0017] Advantageously according to the invention, said bearing plane can lie on a plane defined by a first axis and by a second axis, said label generation device can be movable along said first axis and along a third axis orthogonal to said first axis and second axis, and said applying device can be movable along said first axis, along said third axis and along said second axis orthogonal to said first axis.

[0018] Further according to the invention, said machine for labelling workpieces can comprise an oblong supporting element movable long said first axis, said oblong supporting element being associated to said label generation device and said applying device.

[0019] Again according to the invention, said label generation device can be positioned at an intermediate zone of said oblong supporting element.

[0020] Conveniently according to the invention, said machine for labelling workpieces can comprise a movement system comprising an articulated system connected between said oblong supporting element and said label generation device and actuating means for activating said articulated system, in such a way that said label generation device can move, with respect to said oblong supporting element, according to a curved trajectory lying on a plane defined by said first axis and said third axis.

[0021] Advantageously according to the invention, said machine for labelling workpieces can comprise a movement system located between said oblong supporting element and said label generation device and equipped with actuator means configured in such a way as to determine, in use, on said label generation device, a movement along said first axis and a movement along said third axis.

[0022] Further according to the invention, said actuator means can comprise a first activating element and a second activating element equipped with an oblique surface on which slide said label generation device, said first activating element is designed to impose a movement along said first axis to said label generation device and to said

oblique surface, said oblique surface being positioned in such a way as to impose, in use, a movement along said third axis to said label generation device.

[0023] Again according to the invention, said machine for labelling workpieces can comprise a guide system for guiding the movement of said label generation device along said first axis and said third axis.

[0024] Conveniently according to the invention, said machine for labelling workpieces can comprise a suction system and said applying device can comprise, in its lower part, a piston movable along said third axis and connected to said suction system to allow, in use, the retaining of at least one label by said piston.

[0025] Another object of the invention is a method for applying at least one label on at least one workpiece by means of a machine for labelling workpieces as described above, said method comprising the steps of: generating at least one label by means of said label generation device; moving said label generation device towards said applying device with a motion which comprises at least one component of motion according to said third axis, in such a way as to allow the transfer of said at least one label generated by said label generation device from said label generation device to said applying device; and moving said applying device towards said at least one workpiece placed on said bearing plane, in such a way as to allow the transfer of said at least one label from said applying device to said at least one workpiece.

[0026] The invention is now described, by way of example and without limiting the scope of the invention, with reference to the accompanying drawings which illustrate preferred embodiments of it, in which:

Figure 1 is an overall axonometric view of a machine for labelling workpieces according to a first embodiment of the invention;

Figure 2 is a side view of the machine shown in Figure 1;

Figure 3 is a top plan view of the machine shown in Figure 1 and 2;

Figure 4 is a detailed axonometric view of an assembly of the machine shown in Figures 1 to 3, in a first configuration;

Figure 5 is a first side view of the assembly shown in Figure 4;

Figure 6 is a second side view of the assembly shown in Figure 4;

Figure 7 is an axonometric view of the above-mentioned assembly in a second configuration;

Figure 8 is first side view of the above-mentioned assembly in a third configuration;

Figure 9 is second side view of the above-mentioned assembly in the third configuration;

Figure 10 is an overall side view of the machine according to the first embodiment of the invention, in a fourth configuration;

Figure 11 is an overall axonometric view of a machine for labelling workpieces according to a second embodiment of the invention;

Figure 12 is a side view of the machine shown in Figure 11;

Figure 13 is a top plan view of the machine of Figures 11 and 12;

Figure 14 is a detailed axonometric view of an assembly of the machine shown in Figure 11, in a first configuration;

Figure 15 is a side view of the assembly shown in Figure 14, in the first configuration;

Figure 16 is a cross-section view through the line A-A of Figure 15;

Figure 17 is a first axonometric view of the assembly of Figures 14 to 16, in a second configuration;

Figure 18 is a second axonometric view of the assembly of Figures 14 to 16, in the second configuration;

Figure 19 is a side view of the assembly of Figures 14 to 16, in the second configuration;

Figure 20 is a cross-section view through the line B-B of Figure 19;

Figure 21 is a first axonometric view of the assembly of Figures 14 to 20, in a third configuration;

Figure 22 is a second axonometric view of the assembly of Figures 14 to 20, in the third configuration;

Figure 23 is a side view of the assembly of Figures 14 to 20, in the third configuration;

Figure 24 is a cross-section view through the line C-C of Figure 23; and

Figure 25 is an overall side view of the machine according to the second embodiment of the invention, in a fourth configuration.

[0027] The similar parts will be indicated in the various drawings with the same numerical references.

[0028] With reference to Figures 1 to 10, the numeral 1 denotes a first machine for labelling panels comprising a bearing plane 2 to allow the resting of the panels P to be labelled, and supported by two side uprights 3a, 3b opposite each other.

[0029] On the bearing plane 2 there are also elements designed to allow the locking of the panels P during the labelling steps.

[0030] In the machine 1 there is also a straight base support 4, positioned laterally to the structure formed by the bearing plane 2 and by the relative uprights 3a, 3b and equipped, at the top, with a rail 5 extending along a first axis X.

[0031] Along the rail 5 moves an intermediate connecting support 6 rigidly connected to an operating unit 7 (see Figures 4 to 9) positioned above the bearing plane 2.

[0032] In particular, the operating unit 7 comprising a transversal member 8 orientated along a second axis Y orthogonal to said first axis X and rigidly connected to the intermediate connecting support 6.

[0033] At the lower part of the transversal member 8 is connected a printer 9, that is to say, a device for generating labels, by means of an articulated parallelogram

system 10 configured in such a way as to make possible movements of the printer 9 according to a curved trajectory lying on a plane formed by the first axis X and by a third axis Z orthogonal to said first axis X and said second axis Y, between a rest position, wherein the printer 9 is at a predetermined level beneath the transversal member 8 (see Figures 4 to 6), and an operating position in which the printer 9 is positioned at a higher level, not aligned with the transversal member 8 according to the first axis X (see Figures 8 and 9).

[0034] The above-mentioned articulated parallelogram system 10 s activated by a pneumatic system 10' of the piston-cylinder type.

[0035] The printer 9 is located at a substantially central zone of the transversal member 8 and is equipped with a dispensing unit 11 on which rests the label just dispensed by the printer 9.

[0036] The operating unit 7 also comprises an applying device 12 equipped, beneath, with a piston 13, movable according to the third axis Z, facing the bearing plane 2.

[0037] In the piston 13 there is at least one channel connected to a vacuum generation system and leading to the bottom of the piston 13, where there is a spongy element, to allow the retaining of the label on the spongy element by air suction.

[0038] The applying device 12 is also designed to slide, along said second axis Y, on a guide element 14 fixed to a side face of the transversal member 8, in such a way that said applying device 12 can move towards and away from the printer 9.

[0039] After having positioned and locked the panel P to be labelled on the bearing plane 2, the operating unit 7 moves along the first axis X to be positioned above a predetermined area of the panel P locked on the bearing plane 2.

[0040] Subsequently, after the applying device 12 has moved along the guide element 14 from its rest position shown in Figures 4 to 6 to the pick-up position shown in Figures 7 to 9, the printer 9 moves, in turn, from the relative rest position to the operating position, in which the label present o the dispensing unit 11 comes into contact with the spongy element present on the lower part of the piston 13 (see Figures 8 and 9), thereby allowing the picking up of the label by the latter.

[0041] Once these operations have been completed, the printer 9 returns to the relative rest position to allow the applying device 12 to move again along the guide element 14 to position above the zone of the panel P to be labelled.

[0042] At this point, in order to allow the application of the label on the panel P, the piston 13 of the applying device 12 is lowered until the underlying adhesive part of the label makes contact with the upper surface of the panel P, thereby allowing the transfer of the label from the piston 13 to the panel P.

[0043] With reference to Figures 11 to 25, the numeral 101 denotes a second machine for labelling panels comprising a bearing plane 102 to allow the resting of the panels P' to be labelled, and supported by two side uprights 103a, 103b opposite each other.

[0044] On the bearing plane 102 there are also elements designed to allow the locking of the panels P during the labelling steps.

[0045] In the machine 101 there is also a straight base support 104, positioned laterally to the structure formed by the bearing plane 102 and by the relative uprights 103a, 103b and equipped, at the top, with a rail 105 extending along a first axis X'.

[0046] Along the rail 105 moves an intermediate connecting support 106 rigidly connected to an operating unit 107 (see Figures 14 to 24) positioned above the bearing plane 102.

[0047] In particular, the operating unit 107 comprising a transversal member 108 orientated along a second axis Y' orthogonal to said first axis X' and rigidly connected to the intermediate connecting support 106.

[0048] To the lower part of the transversal member 108 is connected a printer 109, that is, a device for generating labels, by means of a movement system 110 which comprises, in turn, a guide system 111 for guiding the movements of the printer 109 along the first axis X' and a third axis Z' orthogonal to the first axis X' and to the second axis Y'.

[0049] The printer 109 is located at a substantially central zone of the transversal member 108 and is equipped with a dispensing unit 112 on which rests the label just dispensed by the printer 109.

[0050] Moreover, from the rear side 113 of the printer 109, opposite the side on which there is the dispensing unit 112, a contact pin 114 protrudes towards said second axis Y', the purpose of which is described in detail below.

[0051] The movement system 110 also includes a pneumatic system 115 equipped with a cylinder 116 and a piston 117 movable, along the first axis X', with respect to the cylinder 116 between a rest position (see Figures 14 to 16) and a position of maximum extraction (see Figures 21 to 24).

[0052] Both the cylinder 116 and the piston 117 are oriented according to the first axis X'.

[0053] The piston 117 is also equipped, at the relative free end, with an activating element 118 which remains abutted against the above-mentioned contact pin 114 of the printer 109 during its alternating rectilinear motion along the first axis X'.

[0054] In the activating element 118 there is an inclined portion 119 located substantially at the same level, according to the above-mentioned third axis Z', of the contact pin 114.

[0055] The inclined portion 119 comprises an oblique surface lying on a plane substantially orthogonal to a first plane formed by the first axis X' and by the third axis Z' and incident to a second plane formed by the first axis X' and by the second axis Y' and to a third plane formed by the second axis Y' and by the third axis Z'.

[0056] The above-mentioned movement system 110 also comprises a return unit for returning the printer 109

from its position when the piston 117 is in the position of maximum extraction (v. figure 21-24) to the position of the printer 109 when the piston 117 was in the rest position (see Figures 14 to 16).

[0057] The operating unit 107 also comprises an applying device 120 equipped, on the relative base, with a piston 121, movable according to the third axis Z', facing the bearing plane 102.

[0058] In the piston 121 there is at least one channel connected to a vacuum generation system and leading to the bottom of the piston 121, where there is a spongy element, to allow the retaining of the label on the latter by air suction by the above-mentioned vacuum generation system.

[0059] The applying device 120 is also designed to slide, along said second axis Y', on a guide element 122 fixed to a side face of the transversal member 108, in such a way that said applying device 120 can move towards and away from the printer 109.

[0060] The operation of the second machine for labelling panels 101, described above, is as follows.

[0061] After having positioned and locked the panel P to be labelled on the bearing plane 102, the operating unit 107 moves along the first axis X' to be positioned above a predetermined area of the panel P' locked on the bearing plane 102.

[0062] Subsequently, after the applying device 120 has moved along the guide element 122 from its rest position shown in Figures 14 to 16 to the pick-up position shown in Figures 17-24, the piston 117 is extracted from the relative cylinder 116 up to the position of maximum extraction allowing, in this way, the printer 109 to move, firstly, sideways along the first axis X' (see Figures 17 to 20) and then to raise along the third axis Z' (see Figures 21 to 24) during the sliding of the contact pin 114 on the inclined portion 119 of the actuating element 118.

[0063] At the end of the vertical stroke of the printer 109, the label already present on the relative dispensing unit 112 comes into contact with the spongy element present on the lower part of the piston 121 (see Figures 22 and 23), in this way allowing the picking up of the label by the latter.

[0064] Once these operations have been completed, the printer 109 returns to the relative rest position shown in Figures 14 to 16 to allow the applying device 120 to move again along the guide element 122 to position above the zone of the panel P' to be labelled.

[0065] At this point, in order to allow the application of the label on the panel P', the piston 121 of the applying device 120 is lowered until the underlying adhesive part of the label makes contact with the upper surface of the panel P', thereby allowing the transfer of the label from the piston 121 to the panel P'.

[0066] The machine according to the invention allows the labelling operations to be carried out rapidly, guaranteeing at the same time the correct application of the label on the workpiece to be labelled.

[0067] This invention is described by way of example only, without limiting the scope of application, according to its preferred embodiments, but it shall be understood that the invention may be modified and/or adapted by experts in the field without thereby departing from the scope of the inventive concept, as defined in the claims herein.

Claims

1. Machine (1, 101) for labelling workpieces which comprises:

   - a bearing plane (2, 102) for bearing at least one workpiece (P, P') to be labelled;
   - a label generation device (9, 109) for generating at least one label, said label generation device (9, 109) being placed above said bearing plane (2, 102); and
   - an applying device (12, 120) for applying said at least one label to said at least one workpiece (P, P');

   wherein said label generation device (9, 109) and said applying device (12, 120) are movable relative to each other to allow said at least one label to be moved from said label generation device (9, 109) to said applying device (12, 120), and
   wherein said applying device (12, 120) and said at least one workpiece (P, P') are movable relative to each other to allow said at least one label to be moved from said applying device (12, 120) to said at least one workpiece (P, P').

2. Machine (1, 101) for labelling workpieces according to claim 1, **characterized in that** said label generation device (9, 109) and said applying device (12, 120) are both movable relative to said bearing plane (2, 102).

3. Machine (1, 101) for labelling workpieces according to claim 1 or 2, **characterized in that** said bearing plane (2, 102) lies on a plane which is defined by a first axis (X, X') and a second axis (Y, Y'), **in that** said label generation device (9, 109) is movable along said first axis (X, X') and along a third axis (Z, Z') which is orthogonal to said first axis (X, X') and said second axis (Y, Y'), and **in that** said applying device (12, 120) is movable along said first axis (X, X'), along said third axis (Z, Z') and along said second axis (Y, Y') which is orthogonal to said first axis (X, X').

4. Machine (1, 101) for labelling workpieces according to claim 3, **characterized in that** it comprises an elongated supporting element (8, 108) which is movable along said first axis (X, X'), said label generation device (9, 109) and said applying device (12, 120)

being associated with said elongated supporting element (8, 108).

5. Machine (1, 101) for labelling workpieces according to claim 4, **characterized in that** said label generation device (9, 109) is placed at an intermediate region of said elongated supporting element (8, 108).

6. Machine (1) for labelling workpieces according to claim 4 or 5, **characterized in that** it comprises a moving system which comprises an articulated system (10) which is connected between said elongated supporting element (8) and said label generation device (9), and actuating means (10') for activating said articulated system (10) such that said label generation device (9) is able to move, relative to said elongated supporting element (8), according to a curved trajectory which lies on a plane which is defined by said first axis (X) and said third axis (Z).

7. Machine (101) for labelling workpieces according to claim 4 or 5, **characterized in that** it comprises a moving system (110) which is provided between said elongated supporting element (108) and said label generation device (109), and provided with actuating means (115, 118) which are configured such as to cause, in use, said label generation device (109) to move along said first axis (X') and along said third axis (Z').

8. Machine (101) for labelling workpieces according to claim 7, **characterized in that** said actuating means comprise a first activating element (115) and a second activating element (118) which is provided with an oblique surface on which said label generation device (109) moves, said first activating element (115) being configured to cause said label generation device (109) and said oblique surface to move along said first axis (X'), said oblique surface being placed such as to cause, in use, said label generation device (109) to move along said third axis (Z').

9. Machine (101) for labelling workpieces according to claim 7 or 8, **characterized in that** it comprises a guide system (111) for guiding a movement of said label generation device (109) along said first axis (X') and said third axis (Z').

10. Machine (1, 101) for labelling workpieces according to any one of preceding claims, **characterized in that** it comprises a suction system and **in that** said applying device (12, 120) comprises, at its lower part, a piston (13, 121) which is movable along said third axis (Z, Z') and connected with said suction system to allow, in use, said piston (13, 121) to hold at least one label.

11. Method for applying at least one label to at least one workpiece (P, P') by a machine (1, 101) for labelling workpieces according to any one of preceding claims, where said method comprises steps of:

- generating at least one label by said label generation device (9, 109);
- moving said label generation device (9, 109) towards said applying device (12, 120) through a motion comprising at least one motion component according to said third axis (Z, Z'), such as to allow said at least one label generated by said label generation device (9, 109) to be moved from said label generation device (9, 109) to said applying device (12, 120); and
- moving said applying device (12, 120) towards said at least one workpiece (P, P') which is placed on said bearing plane (2, 102), such as to allow said at least one label to be moved from said applying device (12, 120) to said at least one workpiece (P, P').

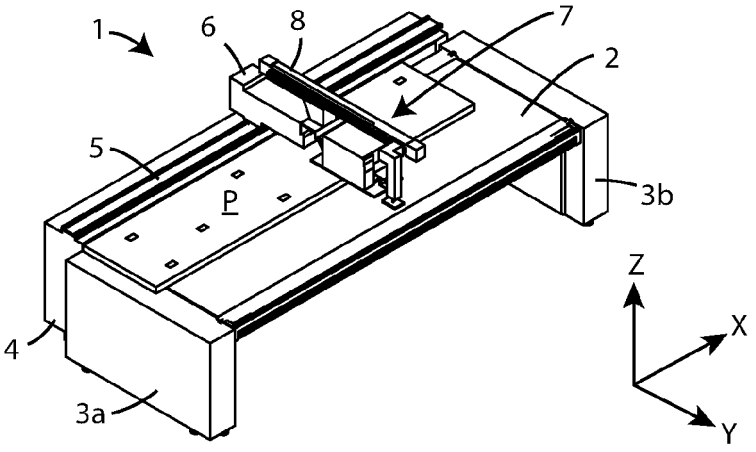

Fig. 1

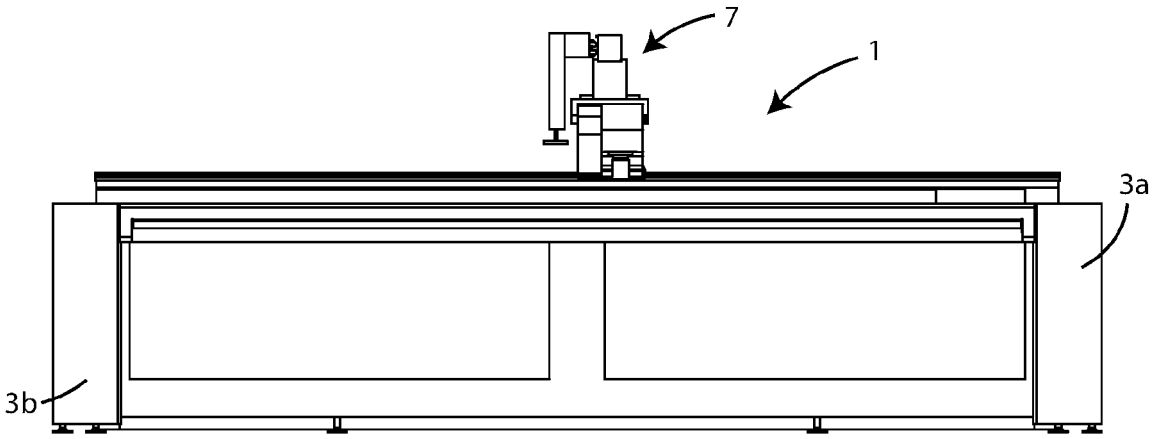

Fig. 2

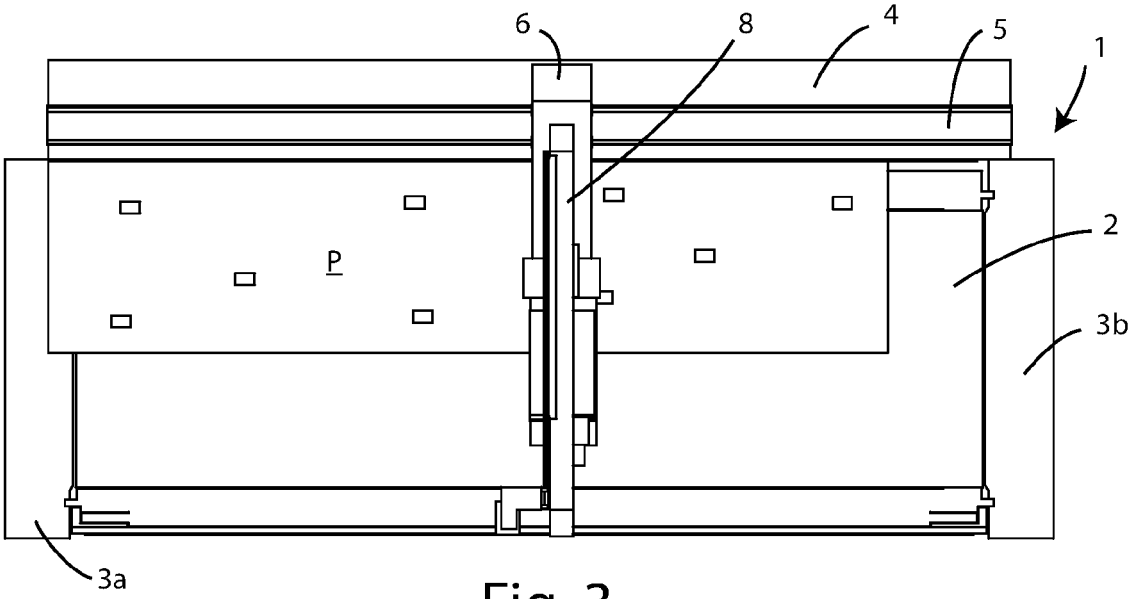

Fig. 3

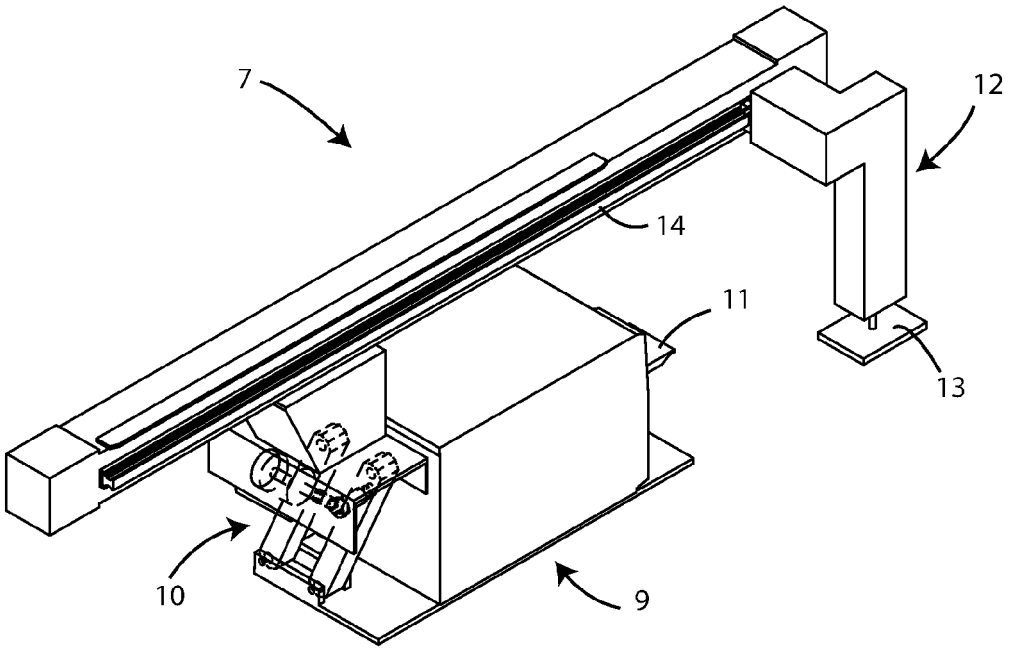

Fig. 4

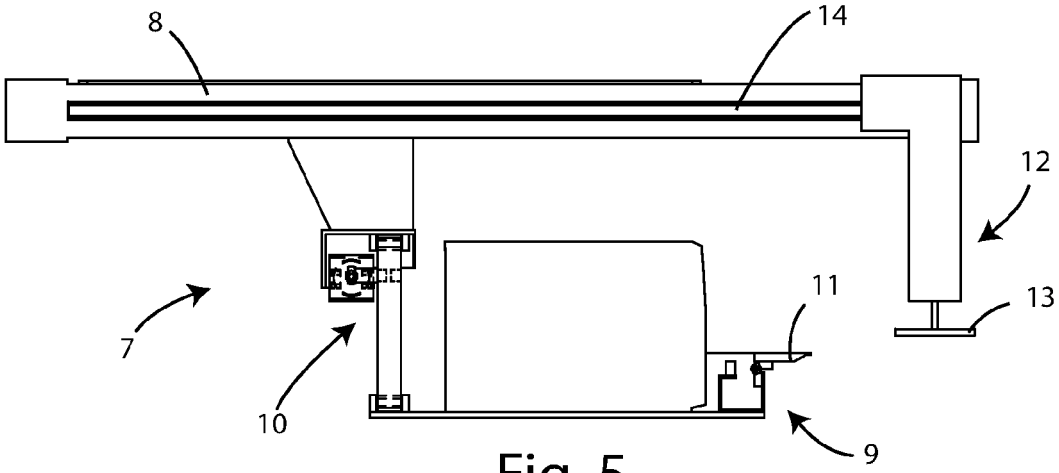

Fig. 5

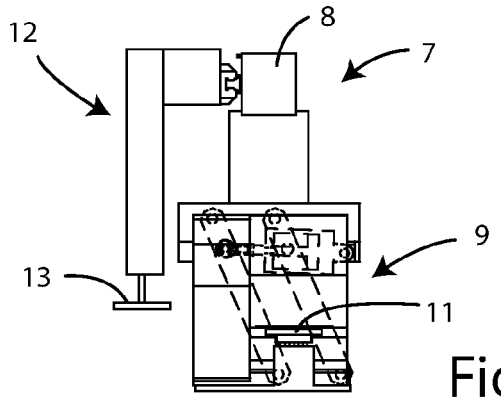

Fig. 6

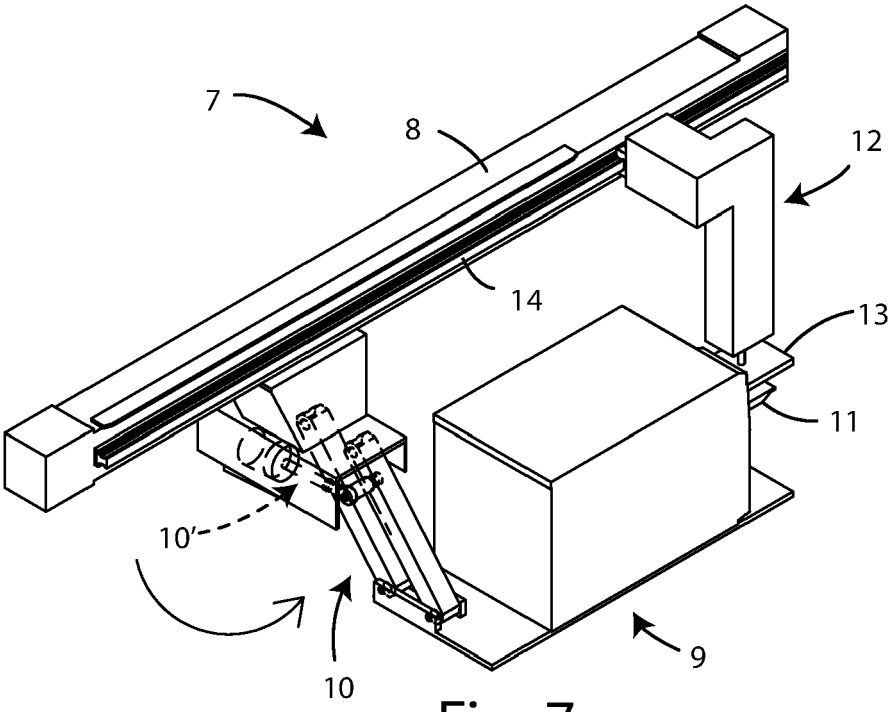

Fig. 7

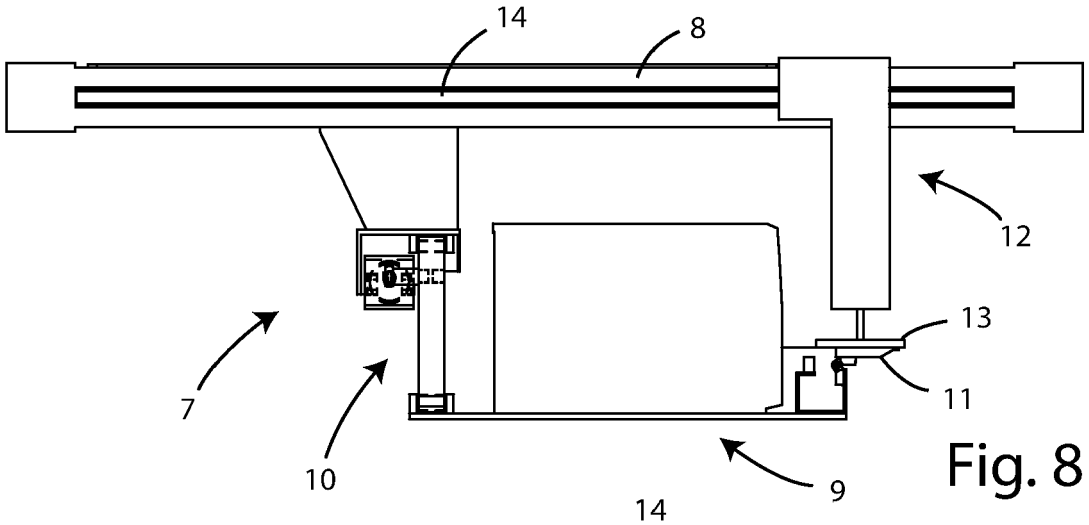

Fig. 8

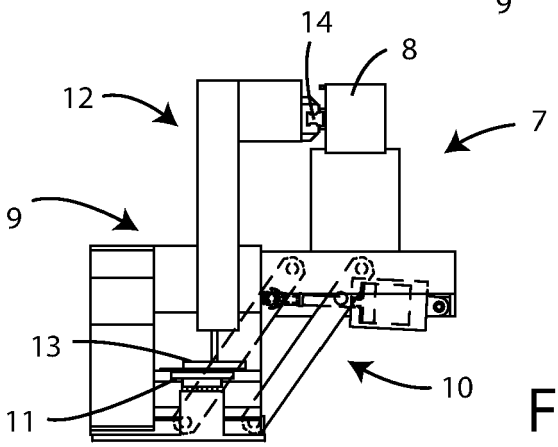

Fig. 9

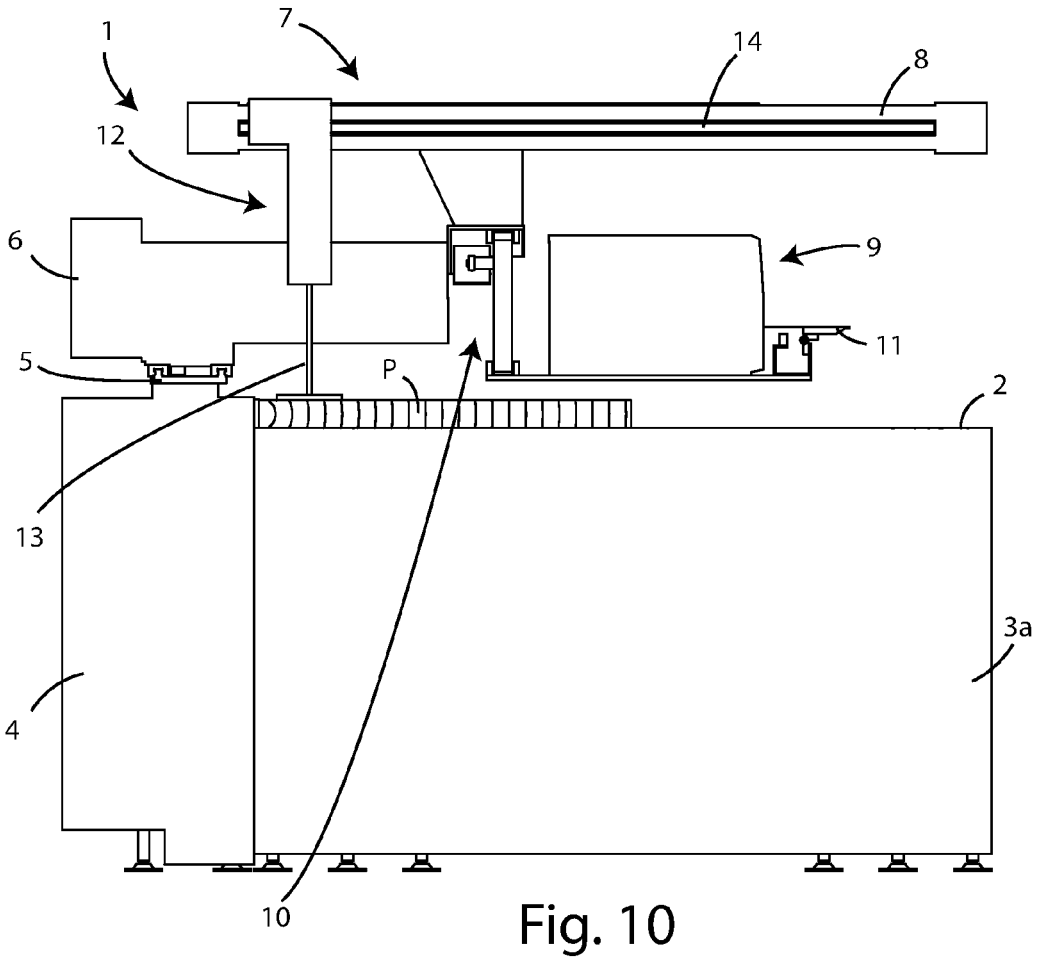
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Fig. 10

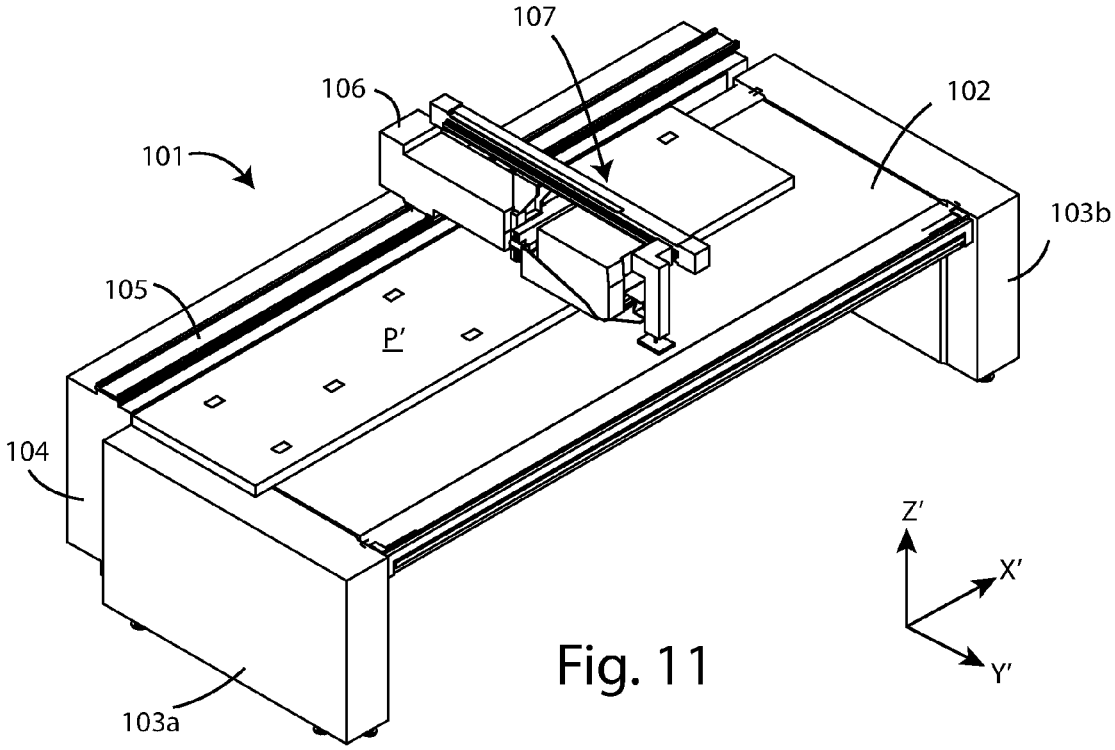
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Fig. 11

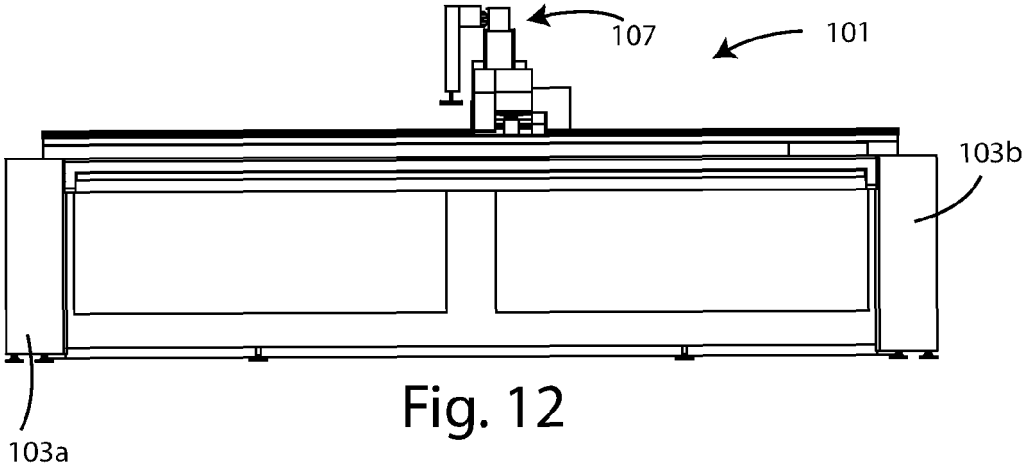


Fig. 12

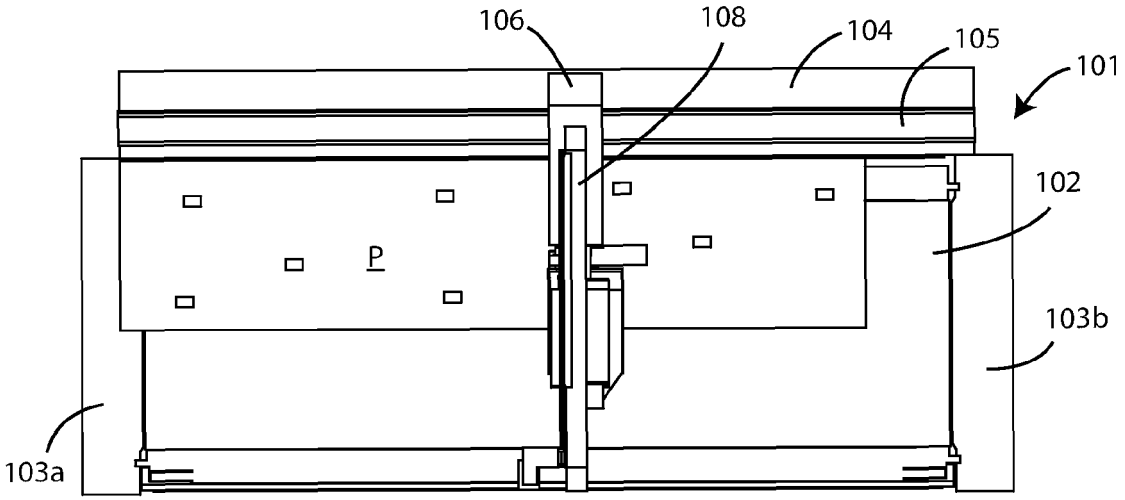
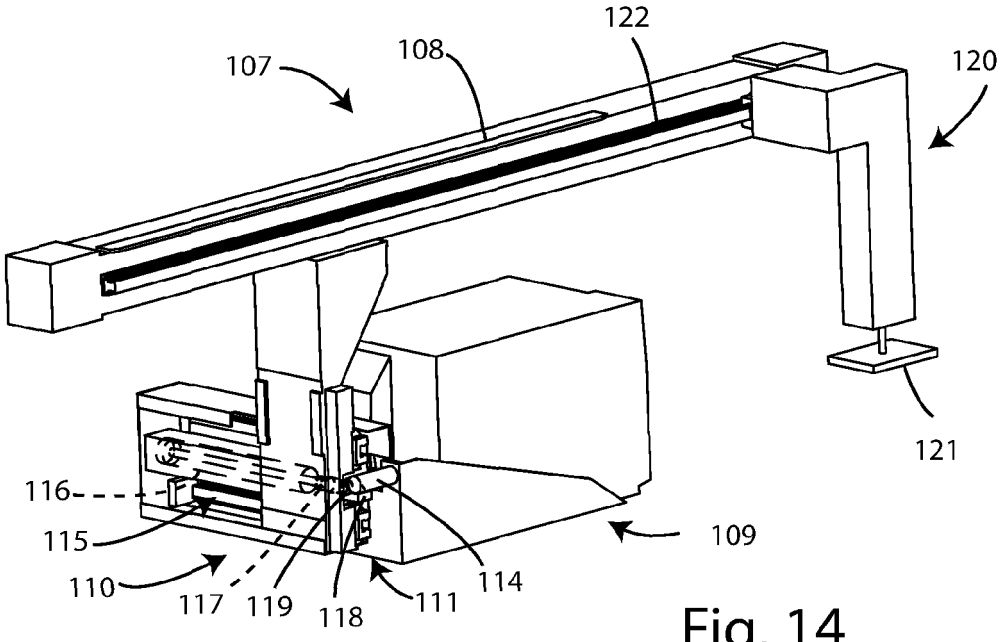


Fig. 13



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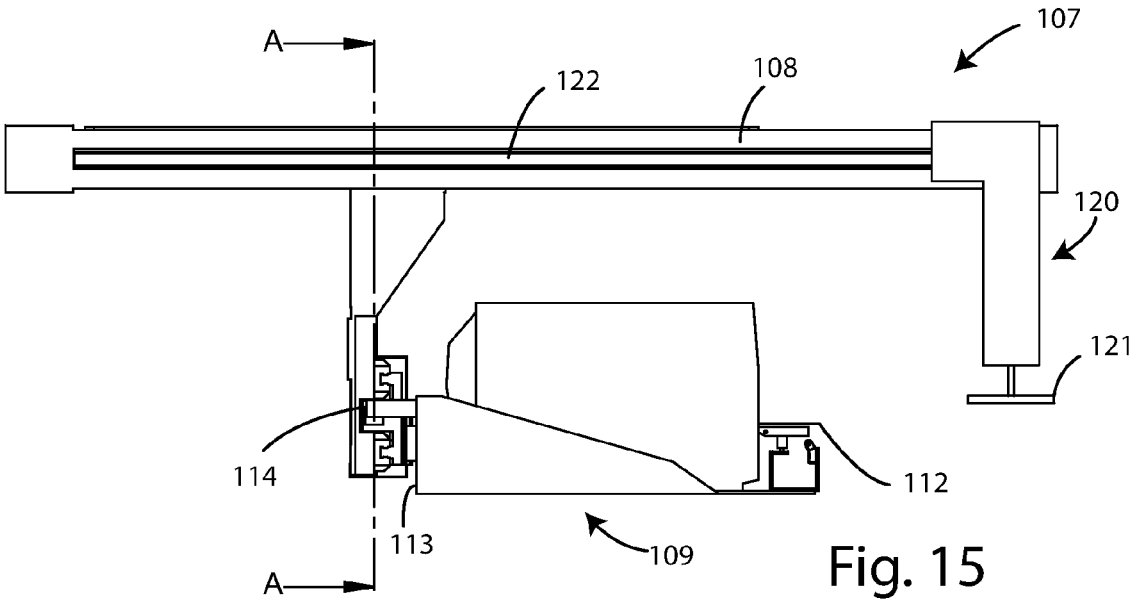

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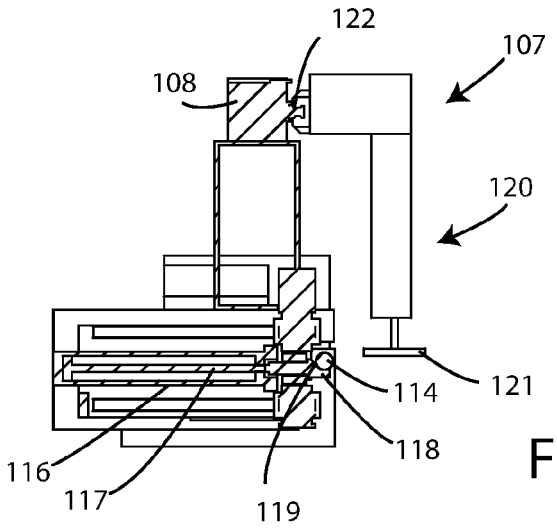


Fig. 16

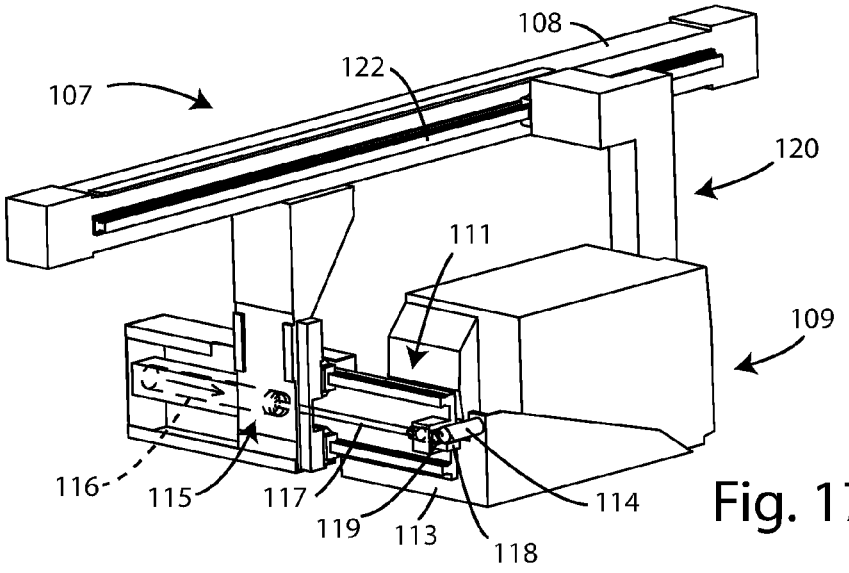
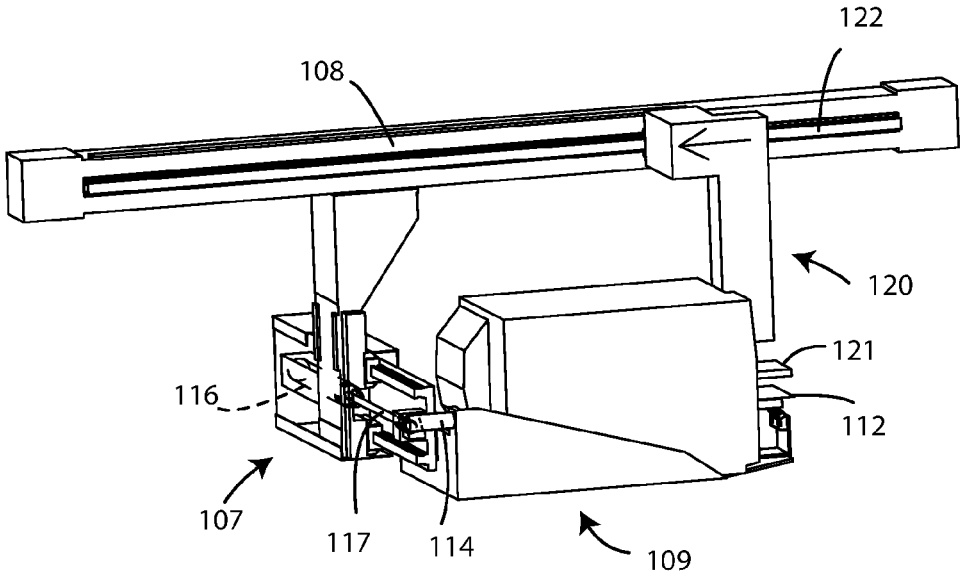


Fig. 17



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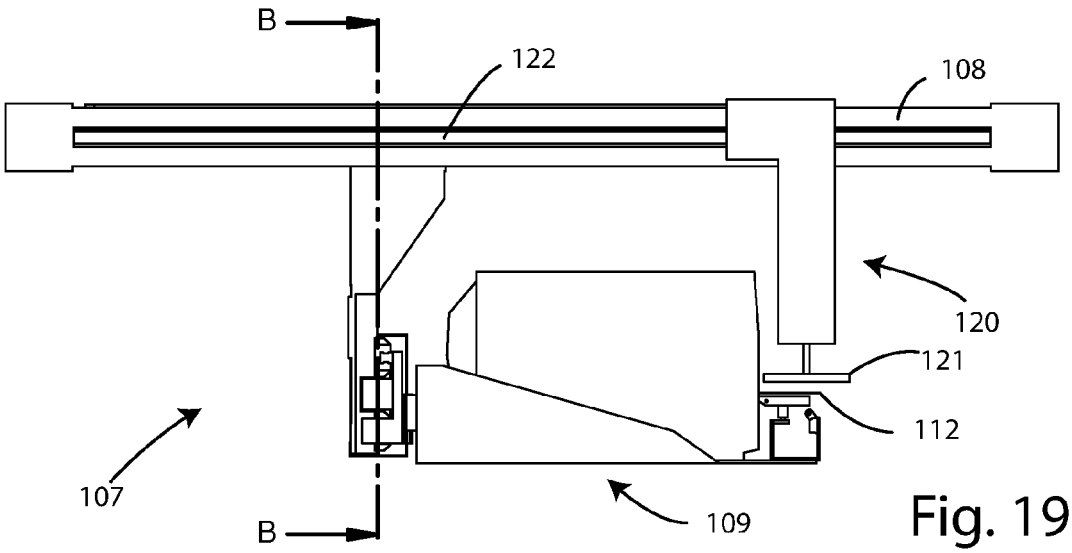

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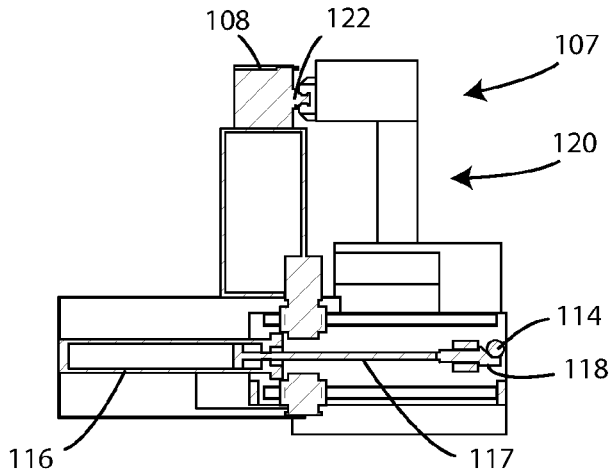

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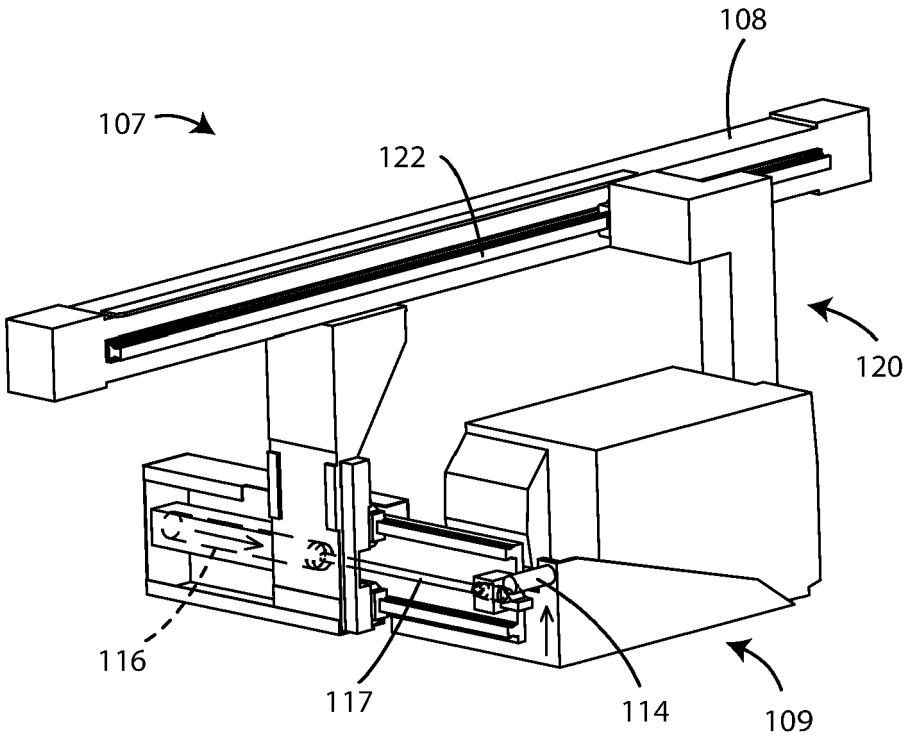
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Fig. 21

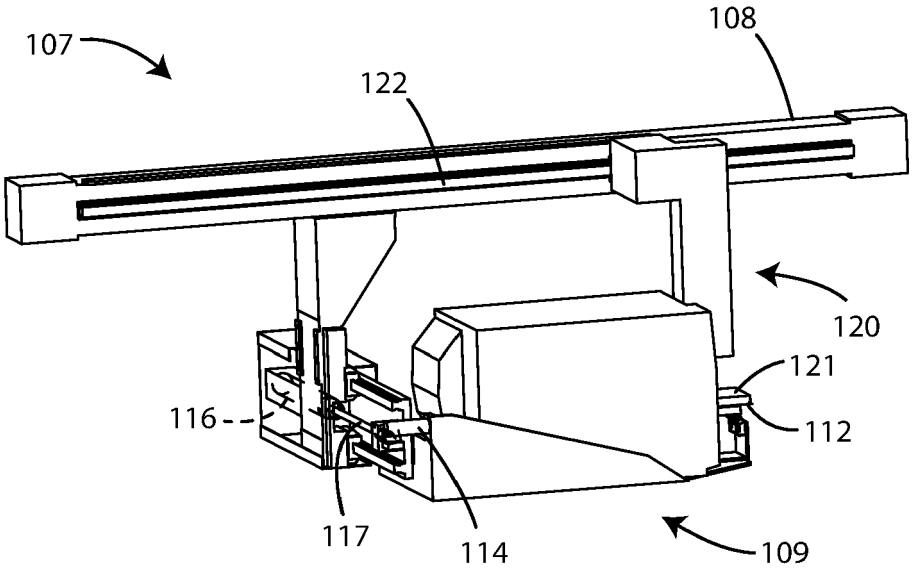
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Fig. 22

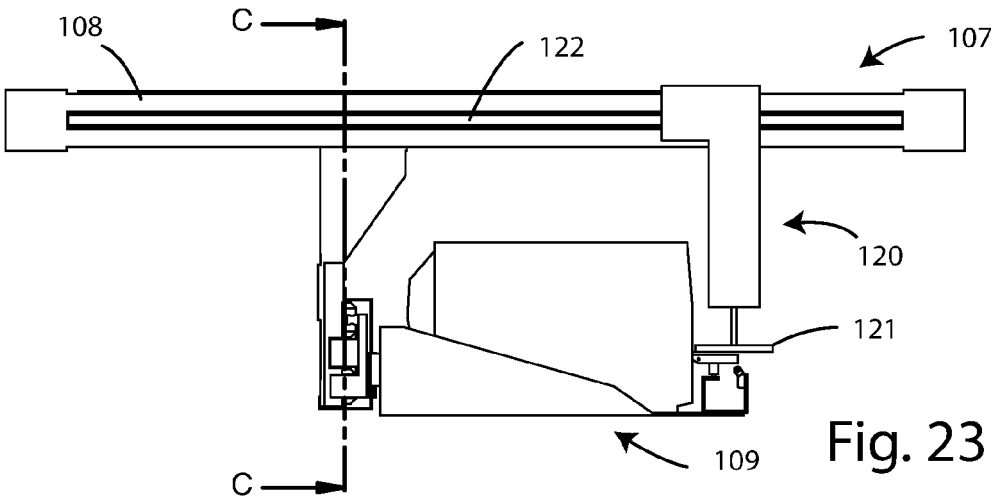

Fig. 23

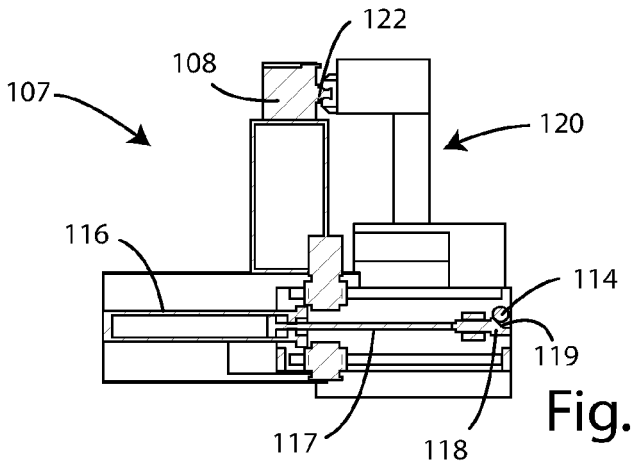

Fig. 24

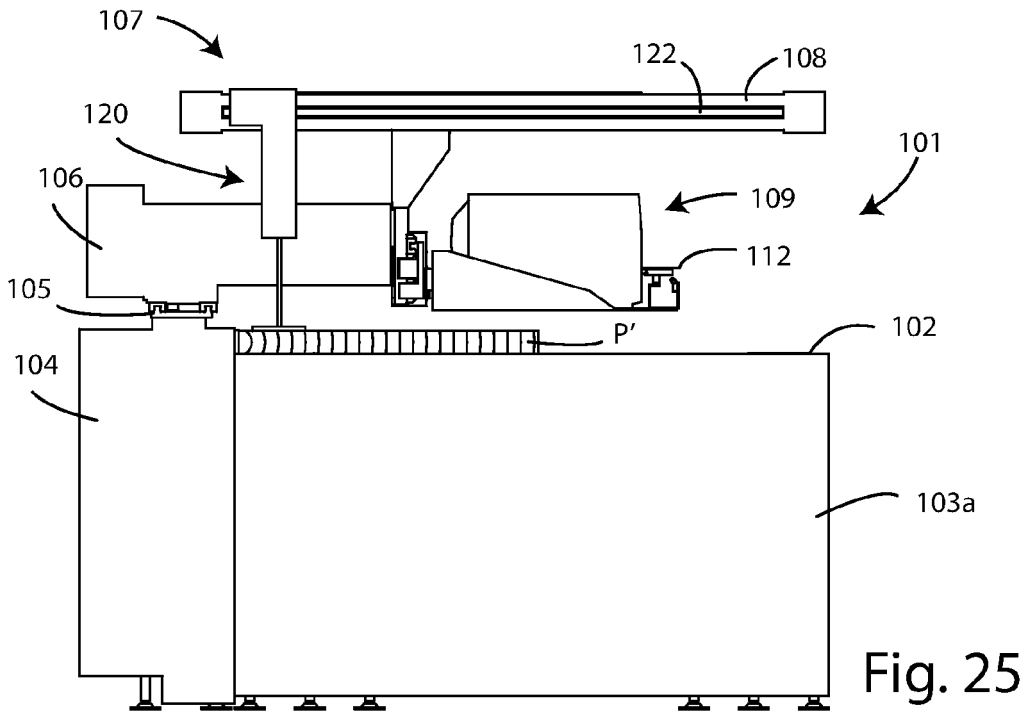

Fig. 25

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 1260

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A	* abstract; figures 5A-5G * * the whole document *	3-9	

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B65C
B67C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 May 2020	Piekarski, Adam

CATEGORY OF CITED DOCUMENTS

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