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(54) PANEL MACHINING MACHINE

(57) The present invention relates to a sanding machine (1) for machining panels (P), comprising a supporting structure (150, 151), and a panel (P) working unit (13) having a frame (134). Said sanding machine (1) comprises a pin (141') integral with said frame (132), and a blocking bar (140), having at least one end (140a, 140b), and rotatable around the pin (141') between a resting position and a working position, in that said frame (134) of said working unit (13) has a seat (135) configured to receive said blocking bar (140) in said working position, and comprises reversible blocking means (141) of the blocking bar (140) in said seat (135), configured to be coupled with said pin (141'), in that said supporting structure (150, 151) has a housing (142, 143) intended to engage said at least one end (140a, 140b). In the resting position, said blocking bar (140) is decoupled from said housing (142, 143) and from said seat (135), and wherein in the working or blocking position, the first end (140a) of said blocking bar (140) is rigidly engaged in said housing (142, 143) of the supporting structure (150, 151). Said blocking means (141) are coupled to said pin (141') and constrain said blocking bar (140) in said seat (135), so as to rigidly couple the working unit (13) to the support structure (1).

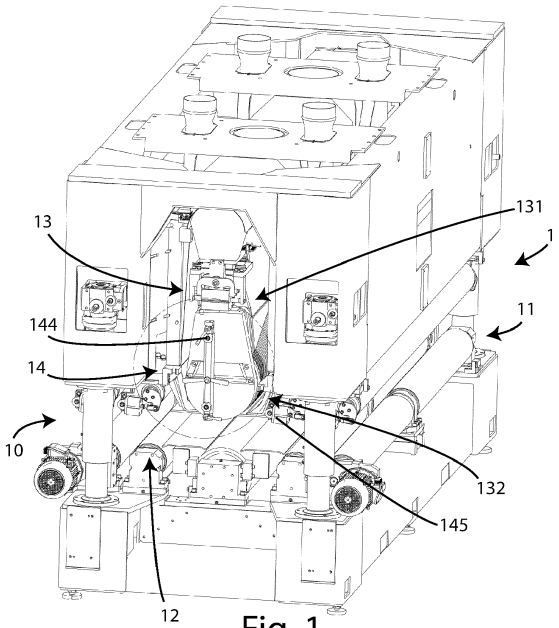

Fig. 1

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Description

[0001] The present invention relates to a panel machining machine.

Field of invention

[0002] More specifically, the invention relates to a machine of the type described, having a blocking unit designed and realized in particular to block a working unit in position on which an abrasive belt is installed to perform finishing operations on the panels.

[0003] In the following, the description will be directed to a sanding machine, but it is clear that the same should not be considered limited to this specific use.

Prior art

[0004] As is known, there are different types of machines for working wood panels and the like.

[0005] In particular, sanding machines are known for smoothing the surfaces of the panels, so as to reduce the imperfections generated by previous machining on the panels.

[0006] Typically, sanding machines comprise at least one sanding unit equipped with an abrasive belt or disc for performing the sanding operations on the movable panels, by means of a conveyor belt, along a forward direction.

[0007] The abrasive belt, generally arranged in a closed loop, has the shape of a flexible cylinder. In particular, the abrasive belt is capable of rotating in equilibrium between at least two rollers: a motorized or driving roller and an idle or driven roller.

[0008] However, as it is known, the abrasive belt wears out easily due to its frequent use in panel sanding operations. Therefore, it is necessary to periodically replace the worsened abrasive belt with a new one, in order to avoid possible interruptions during the sanding operations as well as possible damage to the parts of the sanding machine.

[0009] Known solutions provide for the presence of spacers with pullers, systems mobile on a cone, or automatic systems pneumatically controlled to block the operation of the sanding machine, to allow the replacement of the deteriorated abrasive belt.

[0010] However, a drawback of the known solutions is that, when it is necessary to replace the abrasive belt, it is necessary to use one or more operating spanners to disassemble or tighten parts of the sanding machine, so as to extract the worn abrasive belt. This causes long machine downtimes and, therefore, delays in the processing of the panels.

[0011] A further drawback of the known solutions is that, during the sanding operations, the sanding unit remains elastically suspended from the sanding machine, without being constrained to the sanding machine.

Scope of the invention

[0012] In light of the above, it is, therefore, a scope of the present invention to provide a blocking unit for blocking in position a machining unit in a panel machining machine.

[0013] Another scope of the invention is to provide a blocking unit that allows to replace the worn abrasive belt in a panel machining machine.

[0014] Another scope of the invention is to provide a blocking unit that allows guaranteeing the holding of the workload along the advancement direction of the panel.

[0015] Another scope of the invention is to provide a blocking unit that is highly reliable, relatively simple to make, and at competitive costs when compared to the prior art.

Object of the invention

[0016] It is, therefore, specific object of the present invention a sanding machine for machining panels, comprising a supporting structure, and a panel working unit having a frame, characterized in that said sanding machine comprises a pin integral with said frame, and a blocking bar, having at least one end, and rotatable around the pin between a resting position and a working position, in that said frame of said working unit has a seat configured to receive said blocking bar in said working position, and comprises reversible blocking means of the blocking bar in said seat, configured to be coupled with said pin, in that said supporting structure has a housing intended to engage said at least one end, wherein in the resting position, said blocking bar is decoupled from said housing and from said seat, and wherein in the working or blocking position, the first end of said blocking bar is rigidly engaged in said housing of the supporting structure, and wherein said blocking means are coupled to said pin and constrain said blocking bar in said seat, so as to rigidly couple the working unit to the support structure.

[0017] Always according to the invention, said pin may be threaded and said blocking means may comprise an operating lever, which can be screwed to said pin.

[0018] Still according to the invention, said seat may be a groove.

[0019] Advantageously according to the invention, said sanding machine may comprise a first blocking handle, said blocking bar may have a first end, and said support structure may have a first housing, wherein said first blocking handle is arranged on said first end, and is configured to releasably couple with said first housing in said working position.

[0020] Further according to the invention, said first blocking handle may be adapted to rotate with respect to said blocking bar, so as to be inserted in said respective housing, and said first blocking handle may be configured to lock to said respective housing.

[0021] Always according to the invention, said sanding

machine may comprise a second blocking handle, said support structure may have a second housing, which is sliding, and said blocking bar may have a second end, wherein said second blocking handle is arranged on said second end, and is configured to releasably couple with said second housing in said working position.

[0022] Still according to the invention, said second blocking handle may be adapted to rotate with respect to said blocking bar, so as to be inserted in said respective housing, and said first blocking handle may be configured to lock to said respective housing.

[0023] Advantageously according to the invention, said blocking bar may pass from the resting position to the working position by means of at least one translation movement substantially parallel to the axis of said pin.

[0024] Further according to the invention, said blocking bar may pass between the resting position and the working position by means of at least one rotation movement around the axis of said pin.

[0025] Always according to the invention, said sanding machine may comprise a working plane for the panels with an advancement direction, wherein the axis of the pin is oriented along a direction substantially transverse to the advancement direction of said panels.

[0026] Still according to the invention, the blocking bar in the working position may be oriented along a direction substantially parallel to the advancement direction (D) of the panels.

Brief description of the figures

[0027] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 shows, in perspective view, an embodiment of a machine for machining panels, having a blocking bar in a resting position, according to the present invention;

figure 2 shows, in detail, the blocking bar in the resting position, according to the machine of figure 1;

figure 3 shows, in perspective view, the machine of figure 1, having the blocking bar in an operative position, according to the present invention;

figure 4 shows, in detail, the blocking bar in the operative position;

figure 5 is a side perspective view of the machine of figure 1; and

figure 6 shows, in a side perspective view, the machine of figure 3.

[0028] In the various figures, similar parts will be indicated with the same reference numbers.

Detailed description

[0029] With reference to figure 1, the machine for machining panels P according to the present invention, wholly indicated with the reference number 1, substantially comprises an input station 10, an output station 11, a handling member 12, for transporting the panels P to be machined from said input station 10 towards said output station 11, a working unit 13 for carrying out machining on said panels P to be machined and a blocking unit 14 to block said working unit 13 in position.

[0030] The input station 10 allows the insertion of the panels P to be machined, while the output station 11 allows the exit of the panels P machined by the working unit 13.

[0031] The handling member 12, equipped with one or more motors (not shown in the figures), transports each panel P to be machined from said input station 10 towards said output station 11, according to an advancement direction D parallel or substantially parallel to an x axis of a Cartesian reference system xyz.

[0032] In the embodiment described, the handling member 12 comprises a plurality of conveyor rollers. However, in other embodiments, the movement member 12 can be of a different type, such as, by way of example, a conveyor belt.

[0033] Furthermore, as can be seen from figure 1, the machine 1 comprises a compartment 15 for housing said working unit 13. The compartment 15 has a first wall 150 and a second wall 151, opposite and facing said first wall 150. Said first 150 and second 151 wall form a support structure.

[0034] The working unit 13 is arranged above said conveyor belt 12 and extends according to a z axis, i.e., according to a direction orthogonal to said advancement direction D.

[0035] In the embodiment described, said working unit 13 is a sanding unit. However, in other embodiments, the type and number of working unit 13 can be different from what is described, without thereby departing from the present invention.

[0036] In particular, the working unit 13 is movable along the z axis and performs the sanding of each panel P according to a y axis, which is orthogonal to the advancement direction D and to the development axis z.

[0037] As can be seen from figure 1, the working unit 13 comprises a first roller or upper roller 131, a second roller or lower roller 132, arranged below said first roller 131, and an abrasive belt 133, arranged around said rollers 131, 132.

[0038] The first roller 131 is a motorized roller. In particular, the rotation of said first roller 131 allows the rotation of said abrasive belt 133 around said rollers 131,132, according to a predetermined rotation direction.

[0039] Instead, the second roller 132 is a driven roller, i.e., without a motor. In particular, the second roller 132 faces the underlying conveyor belt 12, to allow the abrasive belt 133 to come into contact with the upper surface of the panel P, arranged above said conveyor belt 12.

[0040] The working unit 13 also has a frame 134 for supporting the various elements described. Said frame

134 also has a seat 135, which in the embodiment at issue is a groove, the function of which will be better defined below. In other embodiments, said seat can also be shaped in a different way.

[0041] In other embodiments, the type and number of said rollers 131, 132 can be different from what is described, without thereby departing from the present invention. In fact, the working unit 13 can also comprise more than two rollers or sanding tools.

[0042] The abrasive belt 133 allows sanding the surfaces of panel P.

[0043] In particular, said abrasive belt 133, arranged on said rollers 131, 132, contacts the upper surface of the panel P, so as to perform the sanding operations on the upper surface of the panel P.

[0044] The blocking unit 14, arranged at said second roller 131, comprises a blocking bar 140, an operating lever 141, coupled to said blocking bar 140, a first housing 142 fixed to the first wall 150 of the compartment 15 and a second housing 143, fixed to the second wall 151 of the compartment 15. The second housing 143 is slidable, so as to fit into position when the blocking bar 140 is rotated and placed in the working or blocking position.

[0045] The blocking bar 140 is able to rotate around a fulcrum F (point around which the rotation takes place) between a resting position, in which the blocking bar 140 is parallel or substantially parallel to the z axis, i.e., perpendicular to the advancement direction D, and an operating position, in which the blocking bar 140 is parallel or substantially parallel to the x axis, i.e., perpendicular to the advancement direction D.

[0046] In the present embodiment, the rotation angle of said blocking bar 140 is equal to 90 degrees. However, in other embodiments, the angle of rotation of said blocking bar 140 may be different from what is described.

[0047] As can be seen from figure 2, when the blocking bar 140 is in said resting position, it is possible to insert/extract the abrasive belt 133 in/from said working unit 13.

[0048] In more detail, when the blocking bar 140 is in said resting position, it is possible to replace the worn abrasive belt 133 with a new abrasive belt 133, to be positioned around said rollers 131, 132. In more detail, the replacement of the worn abrasive belt 133 is carried out by exploiting the spaces between said rollers 131, 132 and said walls 150, 151 of said compartment 15.

[0049] On the other hand, when the blocking bar 140 is in said operating position, it is not possible to replace the worn abrasive belt 133 with the new abrasive belt 133.

[0050] In fact, in the operating position, the ends 140a, 140b of said blocking bar 140 are respectively housed or inserted in said first 142 and second 143 housing. This allows the working unit 13 to be rigidly constrained to the machine 1, to support the work load.

[0051] More specifically, at the first 140a and at the second 140b end of said blocking bar 140 there are reported blocking handles, indicated respectively with 144 and 145, which are configured to engage with said housings 142, 143.

[0052] More specifically, said first 144 and second 145 blocking handle, when said blocking bar 140 is placed in the working position, are adapted to rotate with respect to it, so as to each fit inside the respective housing 142 and 143. Subsequently, said first 144 and second 145 blocking handles can be rotated to block into the respective housing 142 and 143.

[0053] In other embodiments, further blocking systems of the blocking bar 140 may be provided.

[0054] The operating lever 141, which can be operated by an operator, allows the rotation of the blocking bar 140 from the resting position to the operating position and vice versa.

[0055] In particular, the operating lever 141 is coupled to a blocking pin 141'. Said blocking pin 141' is positioned at the fulcrum F and is capable of blocking/unblocking the blocking bar 140 to/from said roller 132.

[0056] In more detail, by rotating the operating lever 141 in a first direction of rotation it is possible to release the blocking bar 140 from the second roller 132, so that the blocking bar 140 moves from said resting position to said operating position, placing itself in said seat 135 of the frame 134, or from said operating position to said resting position.

[0057] Instead, by rotating the operating lever 141 in a second rotation direction, opposite to the first direction of rotation, it is possible to block the blocking bar 140 to the frame 134, so that the blocking bar 140 is blocked in the resting or in the operating position.

[0058] The operation of the above-described blocking unit 14 is as follows.

[0059] Initially, the working unit 13 is in operation, the blocking bar 140 is in the operating position and the locking pin 141' locks the blocking bar 140 to the frame 134. In particular, when the operating lever 141 is rotated, there is a relative movement between the frame 134 (with respect to said seat 135) and the blocking bar 140.

[0060] When it is intended to replace the worn abrasive belt 133 with a new abrasive belt 133, the operation of the working unit 13 is interrupted.

[0061] Subsequently, the operating lever 141 is rotated in the first rotational direction to unlock the blocking bar 140 from the frame 134.

[0062] At this point, the blocking bar 140 is rotated to pass from the operating position, leaving the seat 135, to the resting position. In particular, by acting on the operating lever 141, there is a relative motion between the blocking bar 140 and the frame 134, and in particular with respect to the seat 135, thus disengaging the blocking bar 140 from the frame 134.

[0063] The operating lever 141 is then rotated in the second rotation direction to block the blocking bar 140 to the frame 134, so as to block the blocking bar 140 in the resting position.

[0064] Subsequently, the worn abrasive belt 133 is extracted from the working unit 13 and a new abrasive belt 133 is positioned around said rollers 131, 132.

[0065] At the end of the replacement, the operating lever 141 is rotated in the first direction of rotation to unlock the blocking bar 140 from the frame 134.

[0066] Then, the blocking bar 140 is rotated to go from the resting position to the operating position.

[0067] The ends 140a, 140b of the blocking bar 140, or more particularly the blocking handles 144 and 145, are respectively inserted into the housings 142, 143.

[0068] The operating lever 141 is then rotated in the second rotation direction to block the blocking bar 140 to the second roller 132, thereby blocking the blocking bar 140 in the operating position.

[0069] Finally, the operation of the working unit 13 is reactivated to perform the sanding operations on the surface of each panel P using the abrasive belt 133.

Advantages

[0070] A first advantage of the blocking unit according to the present invention is that it allows replacement of the worn belt at a higher speed than known solutions, thus avoiding long machine downtimes.

[0071] A further advantage of the blocking unit according to the present invention is that of guaranteeing the holding of the work load along the advancement direction of the panel.

[0072] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Sanding machine (1) for machining panels (P), comprising

   a supporting structure (150, 151), and
   a panel (P) working unit (13) having a frame (134),
   characterized
   in that said sanding machine (1) comprises

   a pin (141') integral with said frame (132), and
   a blocking bar (140), having at least one end (140a, 140b), and rotatable around the pin (141') between a resting position and a working position,

   in that said frame (134) of said working unit (13) has a seat (135) configured to receive said blocking bar (140) in said working position, and comprises reversible blocking means (141) of the blocking bar (140) in said seat (135), configured to be coupled with said pin (141'),

   in that said supporting structure (150, 151) has a housing (142, 143) intended to engage said at least one end (140a, 140b),
   wherein in the resting position, said blocking bar (140) is decoupled from said housing (142, 143) and from said seat (135), and
   wherein in the working or blocking position, the first end (140a) of said blocking bar (140) is rigidly engaged in said housing (142, 143) of the supporting structure (150, 151), and
   wherein said blocking means (141) are coupled to said pin (141') and constrain said blocking bar (140) in said seat (135), so as to rigidly couple the working unit (13) to the support structure (1).

2. Sanding machine (1) according to the preceding claim, **characterized**

   in that said pin (141') is threaded and
   in that said blocking means comprise an operating lever (141), which can be screwed to said pin (141').

3. Sanding machine (1) according to any one of the preceding claims, **characterized in that** said seat (135) is a groove.

4. Sanding machine (1) according to any one of the preceding claims, **characterized**

   in that it comprises a first blocking handle (144),
   in that said blocking bar (140) has a first end (140a), and
   in that said support structure (150, 151) has a first housing (142),
   wherein said first blocking handle (144) is arranged on said first end (140a), and is configured to releasably couple with said first housing (142) in said working position.

5. Machine according to the preceding claim, **characterized**

   in that said first blocking handle (144) is adapted to rotate with respect to said blocking bar (140), so as to be inserted in said respective housing (142), and
   in that said first blocking handle (144) is configured to lock to said respective housing (142).

6. Sanding machine (1) according to any one of the preceding claims, **characterized**

   in that it comprises a second blocking handle (145),
   in that said support structure (150, 151) has a second housing (143), which is sliding, and
   in that said blocking bar (140) has a second end

(140b),
wherein said second blocking handle (145) is arranged on said second end (140b), and is configured to releasably couple with said second housing (143) in said working position.

7. Machine according to the preceding claim, **characterized**

in that said second blocking handle (145) is adapted to rotate with respect to said blocking bar (140), so as to be inserted in said respective housing (143), and
in that said first blocking handle (145) is configured to lock to said respective housing (143).

8. Machine according to any one of the preceding claims, **characterized in that** said blocking bar (140) passes from the resting position to the working position by means of at least one translation movement substantially parallel to the axis of said pin (141').

9. Sanding machine (1) according to any one of the preceding claims, **characterized in that** said blocking bar (140) passes between the resting position and the working position by means of at least one rotation movement around the axis of said pin (141').

10. Sanding machine (1) according to any one of the preceding claims, **characterized in that** it comprises a working plane for the panels (P) with an advancement direction (D), wherein the axis of the pin (141') is oriented along a direction substantially transverse to the advancement direction of said panels (P).

11. Sanding machine (1) according to any one of the preceding claims, **characterized in that** the blocking bar (140) in the working position is oriented along a direction substantially parallel to the advancement direction (D) of the panels (P).

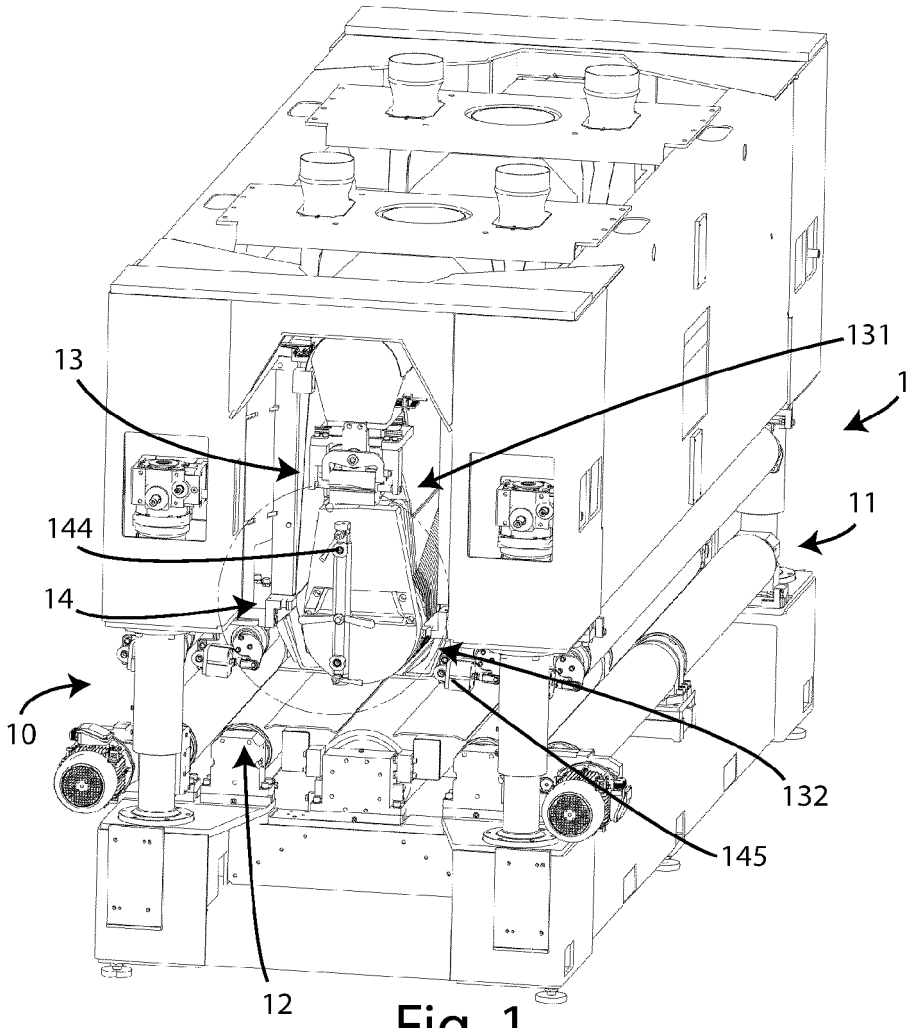
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Fig. 1

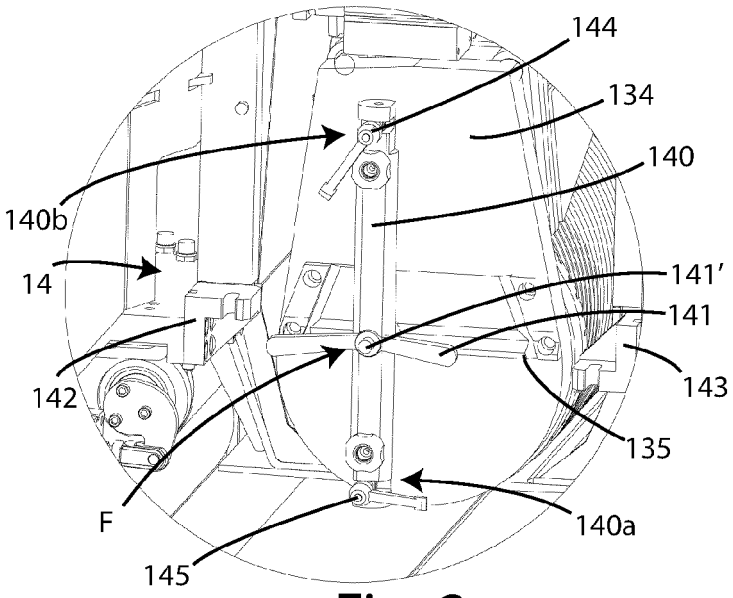
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Fig. 2

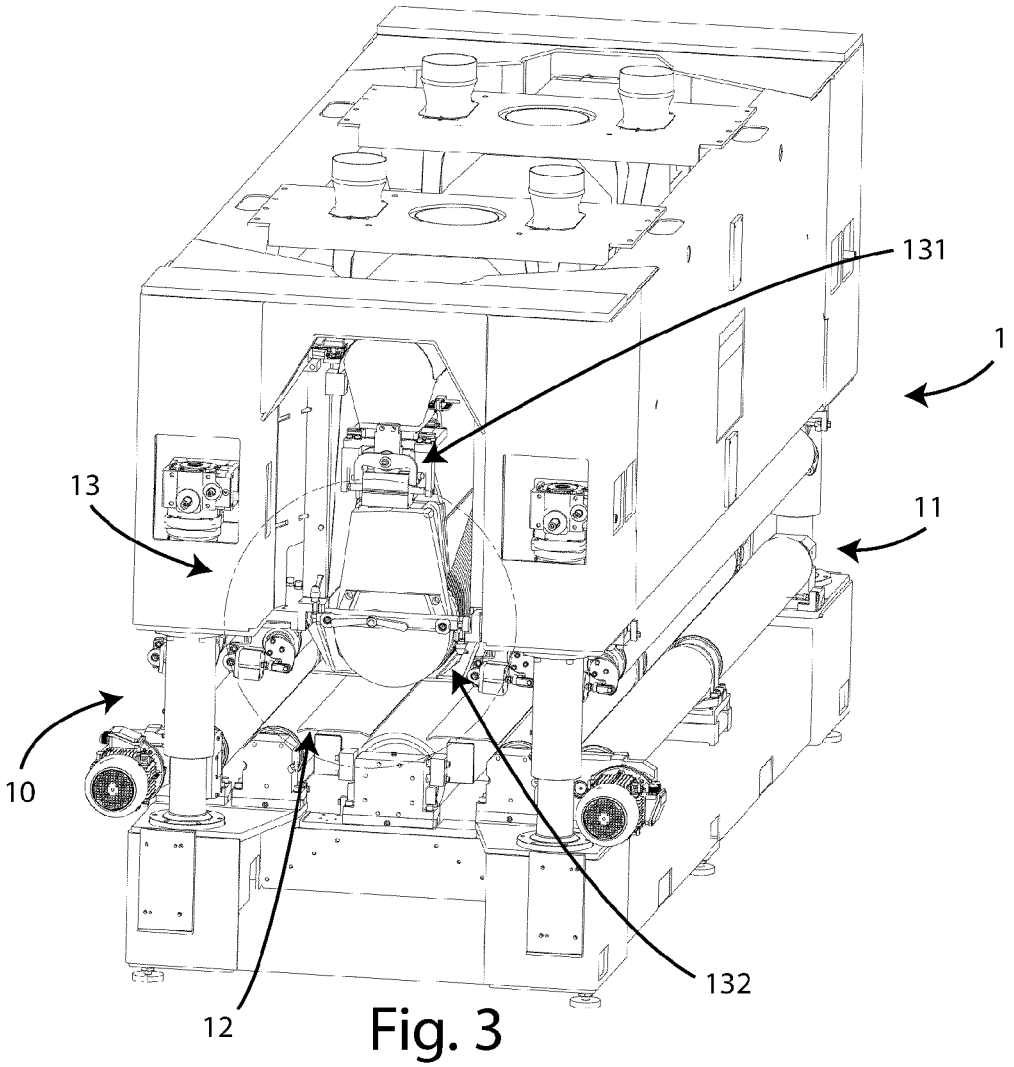

Fig. 3

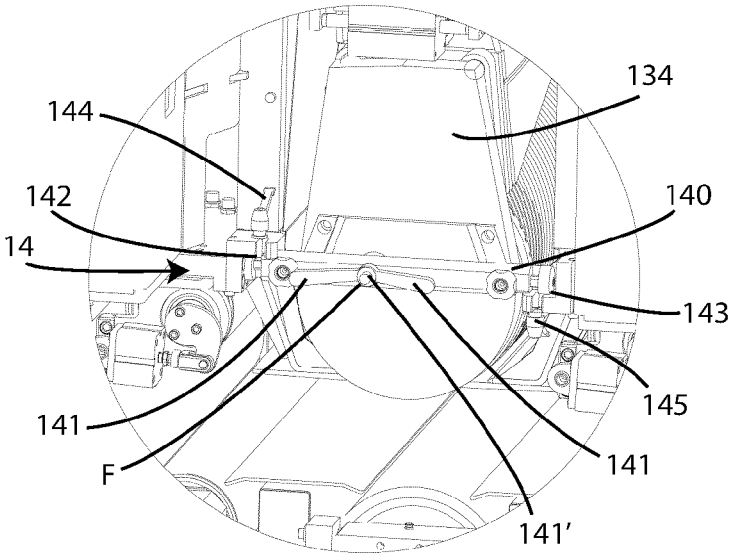

Fig. 4

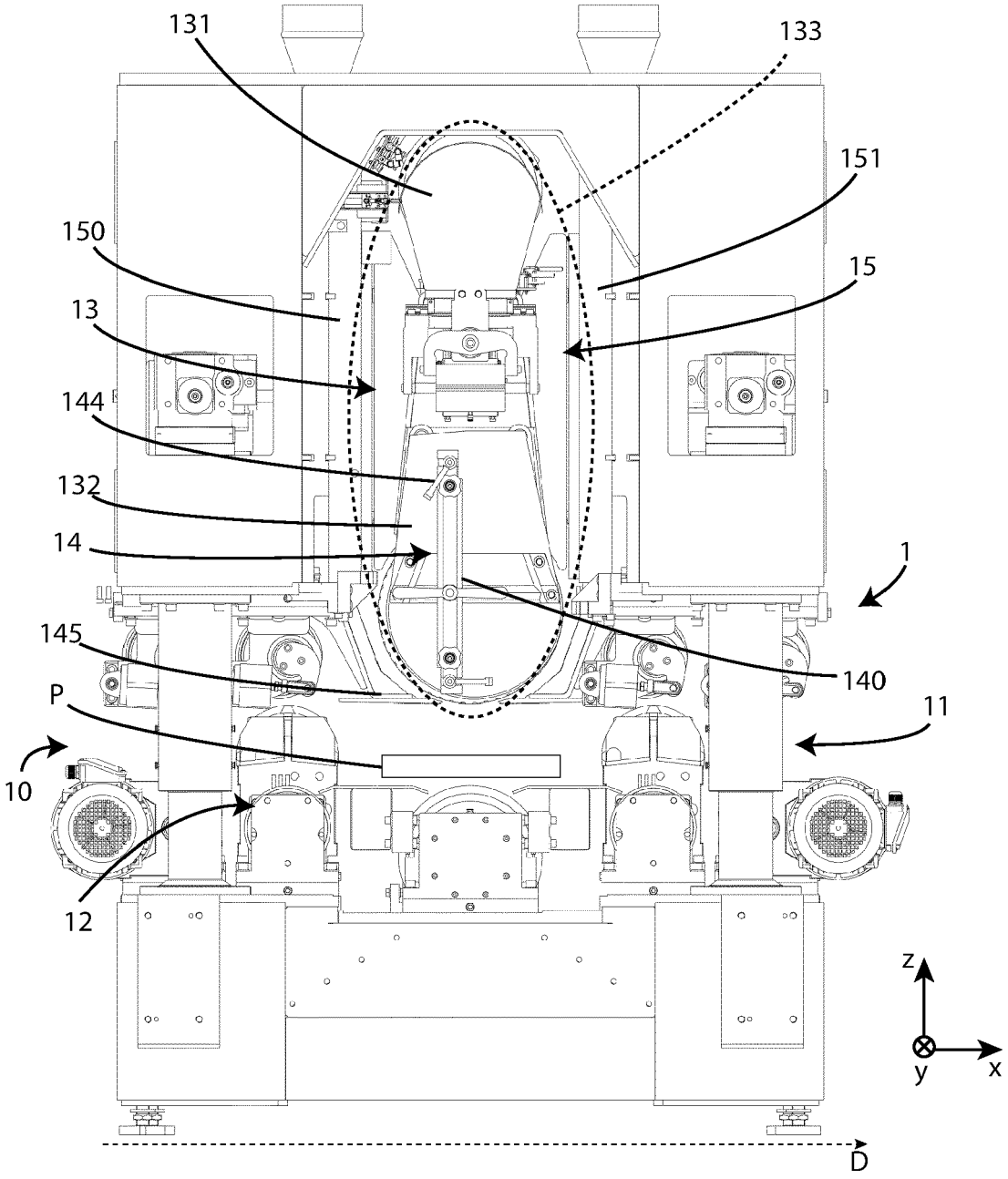

Fig. 5

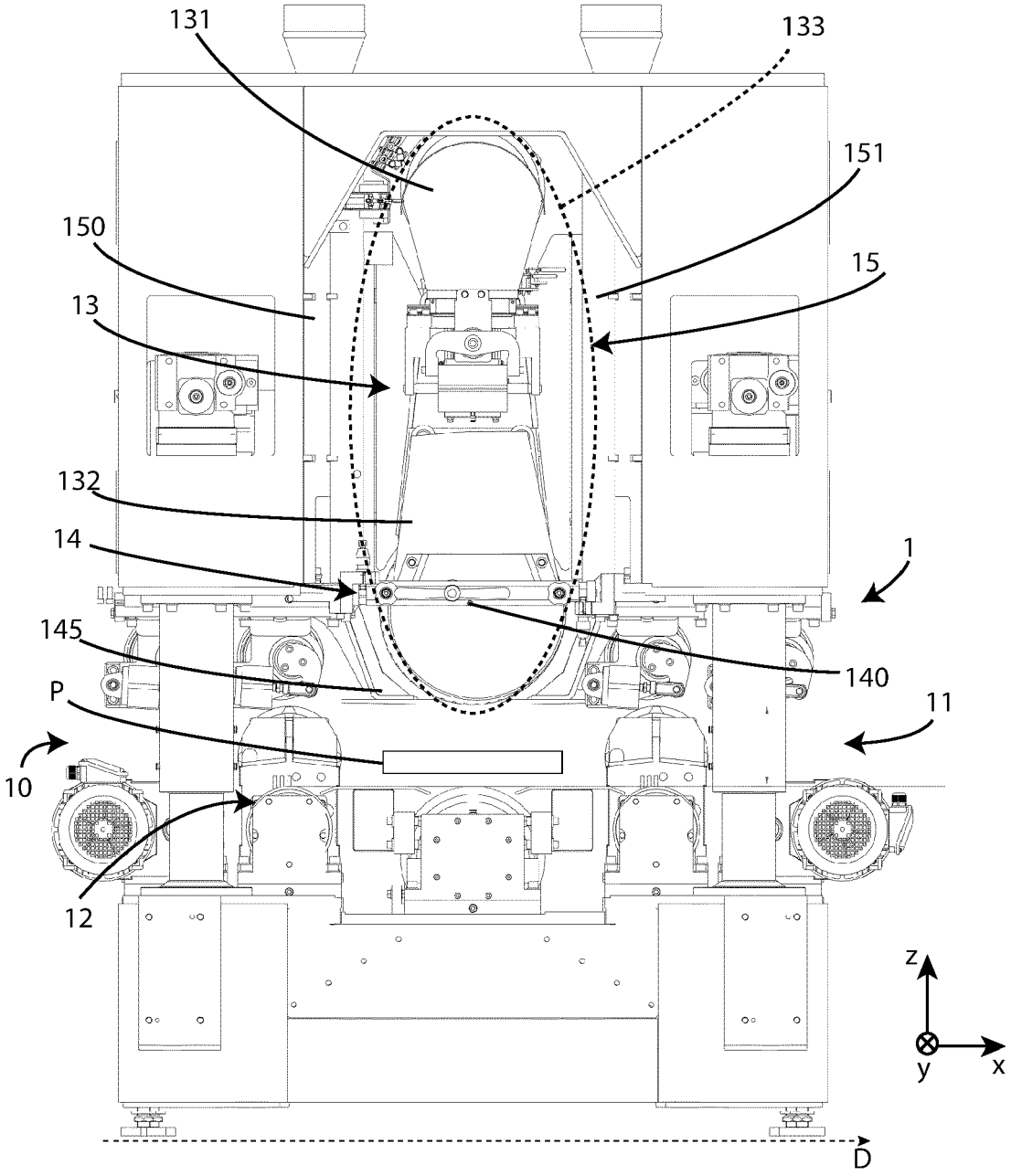

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 23 18 9946

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 213 414 A2 (STEINEMANN TECHNOLOGY AG [CH]) 4 August 2010 (2010-08-04)	1-4,6, 8-11	INV. B24B21/12
A	* paragraph [0009]; claim 1; figures 1-3 *	5,7	B24B21/18 B24B7/28
A	CA 2 505 695 A1 (MAO SHAN MACHINERY IND CO LTD [TW]) 26 October 2006 (2006-10-26) * the whole document *	1-11	B24B7/06 B24B41/047
A	EP 0 127 760 A1 (BAEHRE & GRETEN [DE]) 12 December 1984 (1984-12-12) * the whole document *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

B24B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 September 2023	Endres, Mirja

CATEGORY OF CITED DOCUMENTS

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02-09-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2213414 A2	04-08-2010	CH 700365 A2	13-08-2010
		EP 2213414 A2	04-08-2010
		PL 2213414 T3	29-08-2014
CA 2505695 A1	26-10-2006	NONE	
EP 0127760 A1	12-12-1984	AT E32573 T1	15-03-1988
		DE 3316154 A1	08-11-1984
		EP 0127760 A1	12-12-1984
		US 4546572 A	15-10-1985

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82