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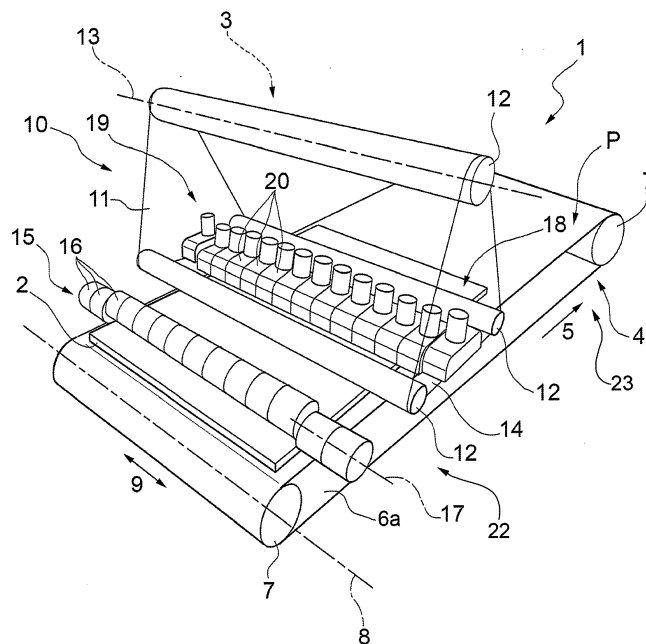
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BA ME**KH MA MD TN**(71) Applicant: **Viet Italia S.r.l.****61122 Pesaro (IT)**(72) Inventor: **BALDUCCI, Fabio****60015 Falconara Marittima (AN) (IT)**(74) Representative: **Manconi, Stefano et al****Studio Torta S.p.A.****Via Viotti, 9****10121 Torino (IT)**(30) Priority: **04.12.2019 IT 201900022965**(54) **MACHINE TOOL FOR THE FINISHING OF PANELS**

(57) A machine tool for the finishing of panels (2) is provided with a feeding device (4), which defines a support plane (P) for at least one panel (2) and is designed to feed the panel (2) from an input station (22) to an output station (23) of the machine tool, a finishing device (10),

which is mounted between the input and output stations (22, 23) so as to carry out a finishing processing of the panel (2), and a braking assembly (24) to ensure a feeding speed (V3) of the panel (2) through the output station (23) at most equal to a given threshold value (V2).

**FIG.1****EP 3 831 530 A1**

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102019000022965 filed on 4/12/2019.

TECHNICAL FIELD

[0002] The present invention relates to a panel finishing machine.

[0003] The present invention finds particularly advantageous application in a sanding machine for sanding/finishing panels made of wood, metal or the like, to which the present description will make explicit reference without thereby losing generality.

BACKGROUND ART

[0004] In the field of sanding/finishing panels made of wood, metal or the like, it is well known to manufacture a sanding machine of the type comprising a feeding device, which defines a substantially horizontal support plane for at least one panel, and is designed to feed the panel in a first, substantially horizontal direction from an input station to an output station of the sanding machine; a sanding device mounted above the support plane to sand an upper face of the panel; and a detection device for detecting a width of the panel in a second direction parallel to the support plane and transverse to the first direction.

[0005] The feeding device normally comprises a lower belt conveyor and a plurality of upper pressure rollers kept in contact with the upper face of the panel to hold the panel on said support plane.

[0006] The sanding device comprises an abrasive band wound in a ring shape around a plurality of idler rollers, and a plurality of thrust elements, which are distributed inside the abrasive band in the second direction, and are movable independently of one another in a third direction orthogonal to the support plane between respective lowered operating positions, in which the corresponding portions of the abrasive band are moved into contact with the upper face of the panel, and respective raised rest positions, in which the corresponding portions of the abrasive band disengage the upper face of the panel.

[0007] When the lower belt conveyor and the abrasive band are operated in mutually opposite directions of rotation so as to cooperate with each other to feed the panel from the input station to the output station, known sanding machines of the type described above have some drawbacks mainly due to the fact that, in case of malfunction of the upper pressure rollers and/or lower belt conveyor and/or sanding device, the feeding speed of the panel at the output station can be relatively high and higher than the feeding speed of the lower belt conveyor, cause the

panel to be ejected from the sanding machine, and compromise the safety of the staff in charge.

DISCLOSURE OF INVENTION

[0008] The object of the present invention is to provide a machine tool for finishing panels, which is free from the drawbacks described above and simple and inexpensive to implement.

[0009] According to the present invention, a machine tool for finishing panels is provided as claimed in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limiting embodiment thereof, wherein:

Figure 1 is a schematic perspective view, with parts removed for clarity, of a preferred embodiment of the sanding machine of the present invention; Figures 2 and 3 are two schematic perspective views, with parts removed for clarity, of a detail of the sanding machine in Figure 1; Figure 4 is a schematic side view, with parts in section and parts removed for clarity, of a detail in Figures 2 and 3; and Figure 5 schematically illustrates the principle of operation of the detail in Figure 4.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] With reference to Figure 1, number 1 indicates, as a whole, a sanding machine for sanding/finishing panels 2 made of wood, metal or the like, substantially parallelepiped in shape.

[0012] The sanding machine 1 comprises a support frame 3 (Figures 2 and 3) and a feeding device 4 mounted on the frame 3 for successively feeding the panels 2 in a horizontal direction 5.

[0013] The device 4 comprises a lower belt conveyor 6a, which has an upper transport branch defining a horizontal support plane P for the panels 2, and is wound in a ring shape around a pair of motorized pulleys 7 mounted so as to rotate, with respect to the frame 3, around respective longitudinal axes 8 parallel to each other and to a horizontal direction 9 transverse to direction 5.

[0014] The device 4 further comprises a plurality of upper pressure rollers 6b kept in contact with the panels 2 to hold the panels 2 on the plane P.

[0015] The sanding machine 1 further comprises a sanding unit 10 comprising, in turn, an abrasive band 11, which is wound in a ring shape around a plurality of idler rollers 12 (in this case three rollers 12), and is fed around the rollers 12 in a direction of rotation opposite to a direction of rotation of the conveyor 6a so as to cooperate with the device 4 to feed the panels 2 in direction 5.

[0016] The rollers 12 are mounted so as to rotate around respective longitudinal axes 13 parallel to direction 9, and are arranged so as to give the band 11 a substantially triangular configuration.

[0017] In particular, the arrangement of the rollers 12 is such that the band 11 has a substantially flat, lower branch 14 parallel to the plane P.

[0018] The sanding machine 1 is further provided with a detection device 15 mounted above and at the entrance of the plane P in order to detect a width of the panel 2 in direction 9.

[0019] In this case, the device 15 is a mechanical device comprising a plurality of contact rollers 16, which are distributed above the plane P in direction 9, and are mounted so as to rotate around respective rotation axes 17 parallel to direction 9.

[0020] As a result of the forward movement of the panel 2 in direction 5, the rollers 16 arranged within the feeding path of the panel 2 are lifted by the panel 2 so as to allow the device 15 to detect the width of the panel 2 in direction 9.

[0021] According to a variant, not shown, the rollers 16 are removed and replaced with a detection device which is not in contact with the panels 2, for example, an optical, inductive or capacitive detection device.

[0022] The lower branch 14 of the band 11 is selectively brought into contact with an upper face 18 of the panels 2 by a thrust device 19 mounted inside the band 11.

[0023] In this case, the device 19 comprises a plurality of thrust elements 20, which are distributed inside the band 11 in direction 9, are mounted above the branch 14, and are movable independently of each other in a vertical direction 21 orthogonal to directions 5 and 9 and perpendicular to the plane P.

[0024] Each element 20 is movable in direction 21 between a lowered operating position, in which the corresponding portion of the band 11 is moved into contact with the face 18, and a raised rest position, in which the corresponding portion of the band 11 is disengaged from the face 18.

[0025] Each panel 2 is fed by the device 4 in direction 5 from an input station 22 to an output station 23 of the machine 1.

[0026] As shown in Figures 2, 3 and 4, the output station 23 is provided with a braking assembly 24 mounted above the plane P and comprising a pair of cranks 25, which are mounted on opposite sides of the conveyor 6a in direction 9, and hinged to the frame 3 so as to rotate, with respect to the frame 3, around a pivot axis 26 parallel to direction 9.

[0027] The assembly 24 also comprises a first transmission shaft 27 rotatably coupled to the cranks 25 so as to rotate, with respect to the cranks 25 and under the thrust of an actuator device 28, around the axis 26.

[0028] The device 28 comprises an electric motor 29, which is fixed to the frame 3, and is connected to the shaft 27 through the interposition of a reducer 30, in this case, a worm screw-worm wheel reducer.

[0029] The two cranks 25 support, at their free ends, a second transmission shaft 31, which is rotatably coupled to the cranks 25 through the interposition of respective rolling bearings 32, and is mounted so as to rotate around a rotation axis 33 parallel to the axis 26.

[0030] The shafts 27 and 31 are connected to each other by a belt transmission 34 comprising a belt 35 wound in a ring around two pulleys 36 keyed to the shafts 27, 31.

[0031] Lastly, the assembly 24 comprises a contact roller 37, which is fitted to the shaft 31 coaxially with the axis 33, and is connected to the shaft 31 through the interposition of a pair of freewheels 38 mounted at the free ends of the roller 37.

[0032] With reference to Figure 5, each freewheel 38 comprises an inner ring 39 coupled in an angularly fixed manner to the shaft 31, an outer ring 40 coupled in an angularly fixed manner to the roller 37, and a plurality of coupling rollers 41 mounted between the rings 39 and 40, parallel to the axis 33.

[0033] Each roller 41 is mounted in a guide groove 42 formed between the rings 39 and 40, and cooperates with a pin 43, which is slidably engaged in a guide hole 44 formed in the ring 39, and is arranged between the roller 41 and a spring 45 housed in the hole 44.

[0034] The operation of the braking assembly 24 will now be described starting from a moment when:

the cranks 25 are rotated around the axis 26 to move and keep the roller 37 in contact with the face 18 of the panel 2;
the plane P of the belt conveyor 6a is fed in direction 5 at a speed V1; and
the transmission shaft 31 is fed around the axis 33 at a peripheral speed V2 at least equal to the speed V1, preferably approximating the speed V1 by excess.

[0035] With regard to the foregoing, it should be pointed out that the electric motor 29:

is adjusted during the tooling up of the assembly 24 so that the speed V2 of the shaft 31 is greater than the maximum speed V1 of the plane P; or
is selectively controlled as a function of the speed V1 of the plane P, for example by means of an inverter connected to the belt conveyor 6a, so that the speed V2 of the shaft 31 is always greater or at most equal to the speed V1.

[0036] At full capacity, due to the existing friction, the panel 2 is fed in direction 5 at a speed V3 substantially equal to speed V1 and the contact roller 37 is fed around the axis 33 at a peripheral speed V4 substantially equal to speed V3 and, therefore, to speed V1.

[0037] Accordingly, since the speeds V1, V3, and V4 are at most equal to speed V2, the coupling rollers 41 of the freewheels 38 are moved against the action of the

springs 45, allowing the roller 37 to rotatably couple to the shaft 31.

[0038] When, in the event of malfunction, for example, of the lower belt conveyor 6a and/or of the aforementioned upper pressure rollers 6b and/or of the sanding unit 10, the speed V3 of the panel 2 at the output station 23 is greater than the speed V1 of the plane P of the conveyor 6a, and therefore the speed V4 of the roller 37 is greater than the speed V2 of the shaft 31, the coupling rollers 41 are moved under the action of the springs 45, allowing the roller 37 to couple in an angularly fixed manner to the shaft 31, therefore to rotate at speed V2, and to slow down the panel 2 at the output station 23 to the same speed V2 as the shaft 31 and the roller 37.

[0039] Therefore, the braking assembly 24 has some advantages mainly due to the fact that the freewheels 38 ensure that the panels 2 at the output station 23 always have a speed V3 which is, at most, equal to the speed V2 of the transmission shaft 31.

Claims

1. A machine tool for the finishing of panels (2) comprising a feeding device (4), which defines a support plane (P) for at least one panel (2) and is designed to feed the panel (2) from an input station (22) to an output station (23) of the machine tool; and a finishing device (10), which is mounted between the input and output stations (22, 23) so as to carry out a finishing processing of the panel (2); and **characterized in that** it further comprises a braking assembly (24) to brake the panel (2) so that a feeding speed (V3) of the panel (2) through the output station (23) is, at the most, equal to a given threshold value (V2).
2. The machine tool according to claim 1, wherein the braking assembly (24) is mounted in the area of the output station (23).
3. The machine tool according to claim 1 or 2, wherein the feeding device (4) and the braking assembly (24) are arranged on opposite sides of the panel (2), in particular so as to engage a lower face and an upper face (18) of the panel (2).
4. The machine tool according to any one of the preceding claims, wherein the feeding device (4) comprises a belt or roller conveyor (6a) defining the support plane (P), and the finishing device (10) comprises an abrasive band (11), which is mounted so as to rotate with a direction of rotation that is opposite to the direction of rotation of the belt or roller conveyor (6a).
5. The machine tool according to any one of the preceding claims, wherein the braking assembly (24) comprises a contact roller (37), which is arranged in contact with an upper face (18) of the panel (2) and mounted so as to rotate around a rotation axis (33), which is transverse to a feeding direction (5) of the panel (2); a transmission shaft (31), which extends through the contact roller (37) and is mounted so as to rotate around the rotation axis (33); and coupling means (38) to angularly lock the transmission shaft (31) and the contact roller (37) to one another.
6. The machine tool according to claim 5, wherein the coupling means (38) comprise at least one freewheel interposed between the transmission shaft (31) and the contact roller (37) and configured to angularly lock the transmission shaft (31) and the contact roller (37) to one another when the feeding speed (V3) of the panel (2) exceeds said threshold value (V2).
7. The machine tool according to claim 5 or 6, wherein the braking assembly (24) further comprises actuator means (28) to move the transmission shaft (31) around the rotation axis (33).
8. The machine tool according to claim 7, wherein the actuator means (28) comprise an electric motor (29) connected to the transmission shaft (31).
9. The machine tool according to claim 8, wherein the actuator means (28) further comprise a control device to selectively control the operation of the electric motor (29) and, hence, a peripheral speed (V2) of the transmission shaft (31) depending on a feeding speed (V1) of the feeding device (4).
10. The machine tool according to any one of the claims 5 to 9, wherein the assembly defined by the contact roller (37) and by the transmission shaft (31) is movable between a lowered operating position, in which the contact roller (37) is in contact with the panel (2), and a raised rest position, in which the contact roller (37) disengages the panel (2).

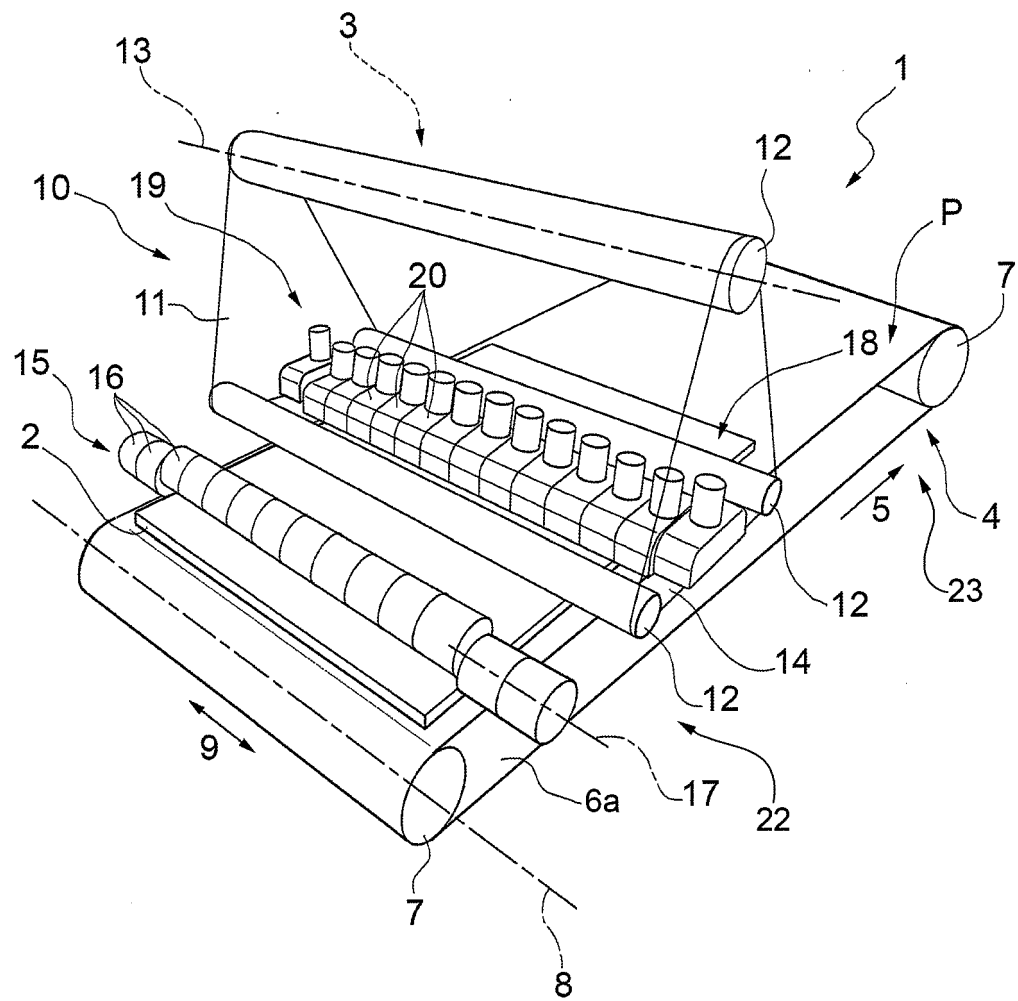
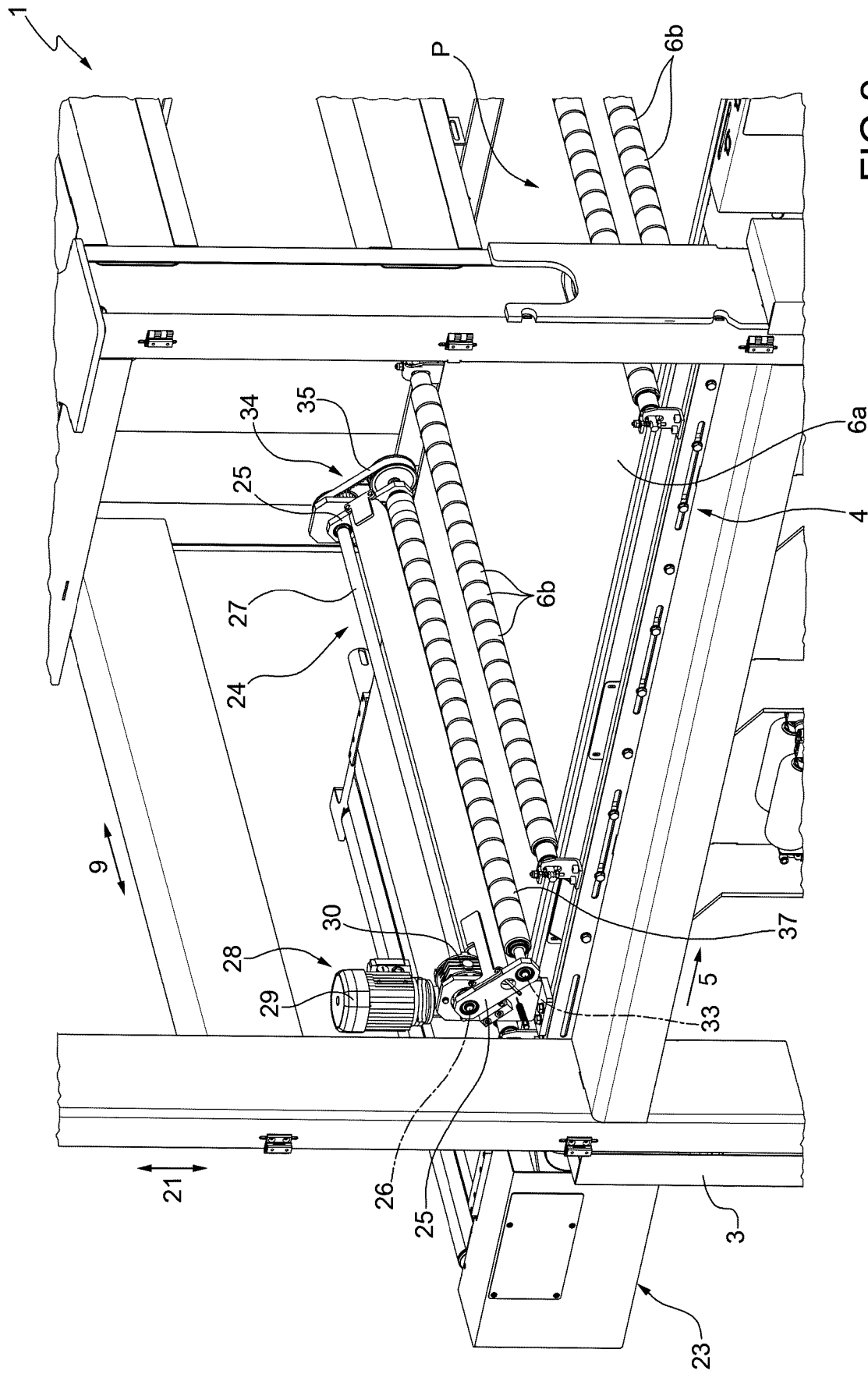


FIG.1



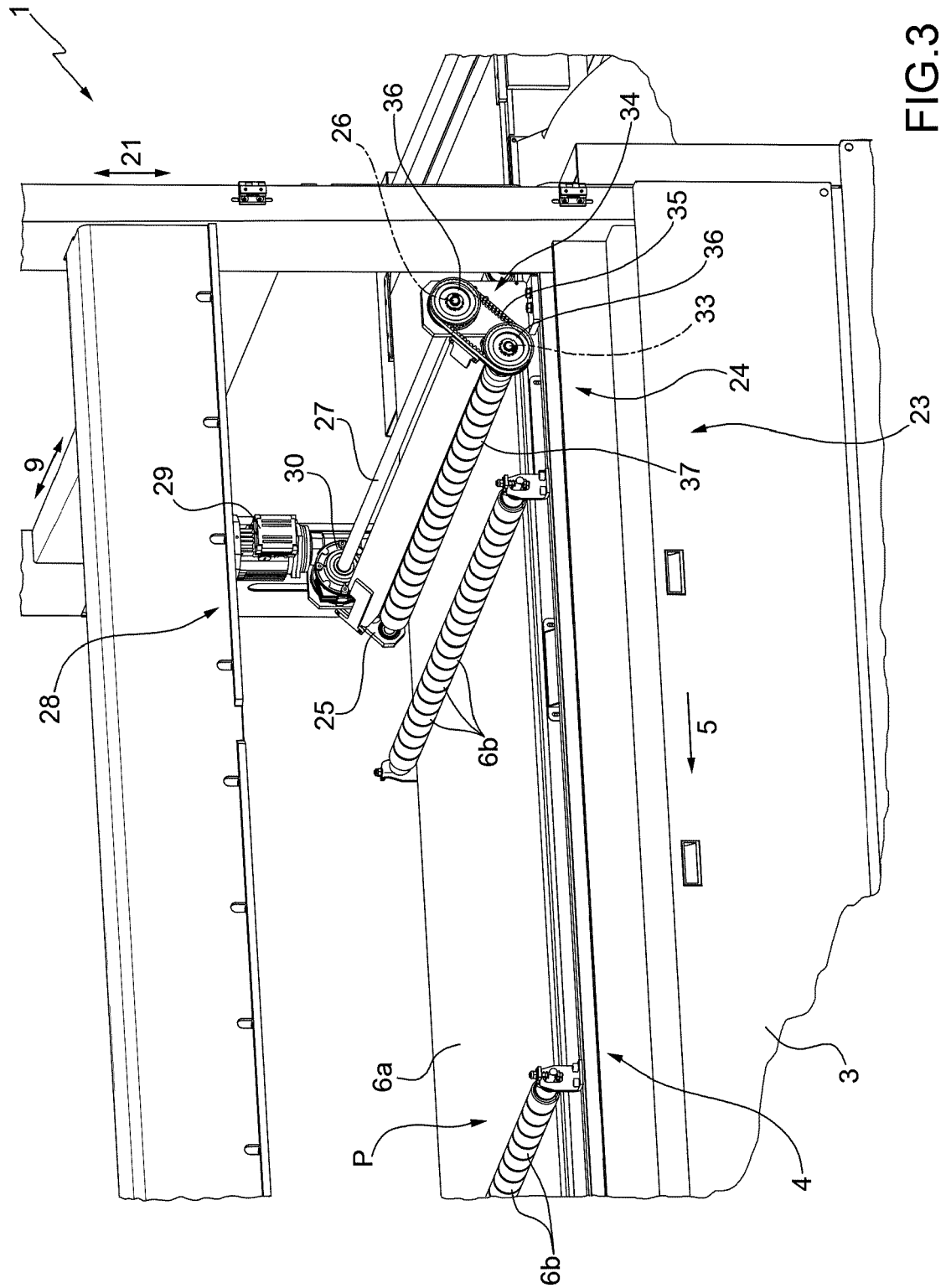


FIG.3

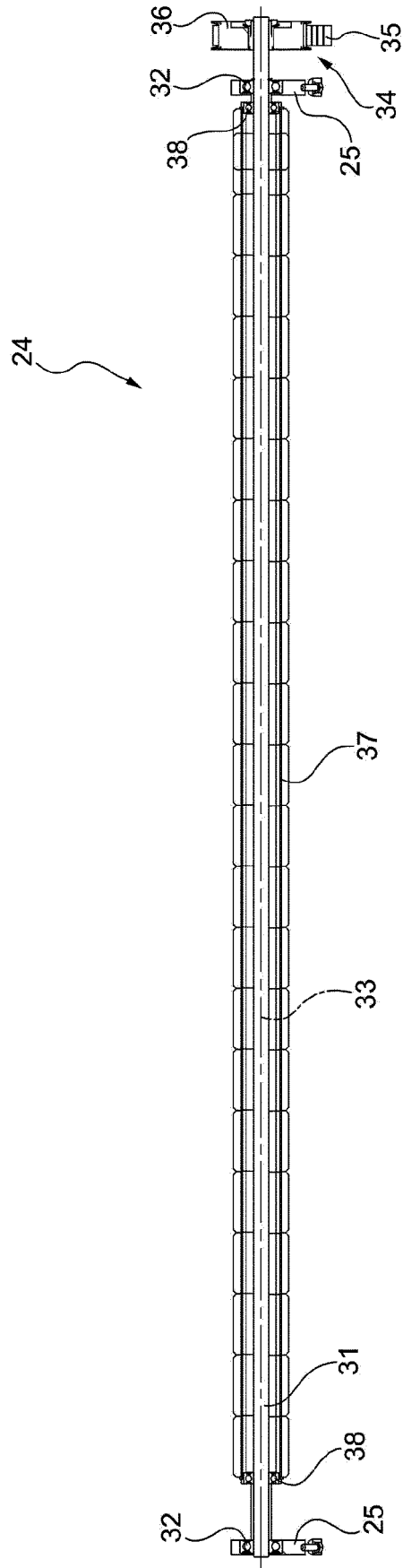


FIG.4

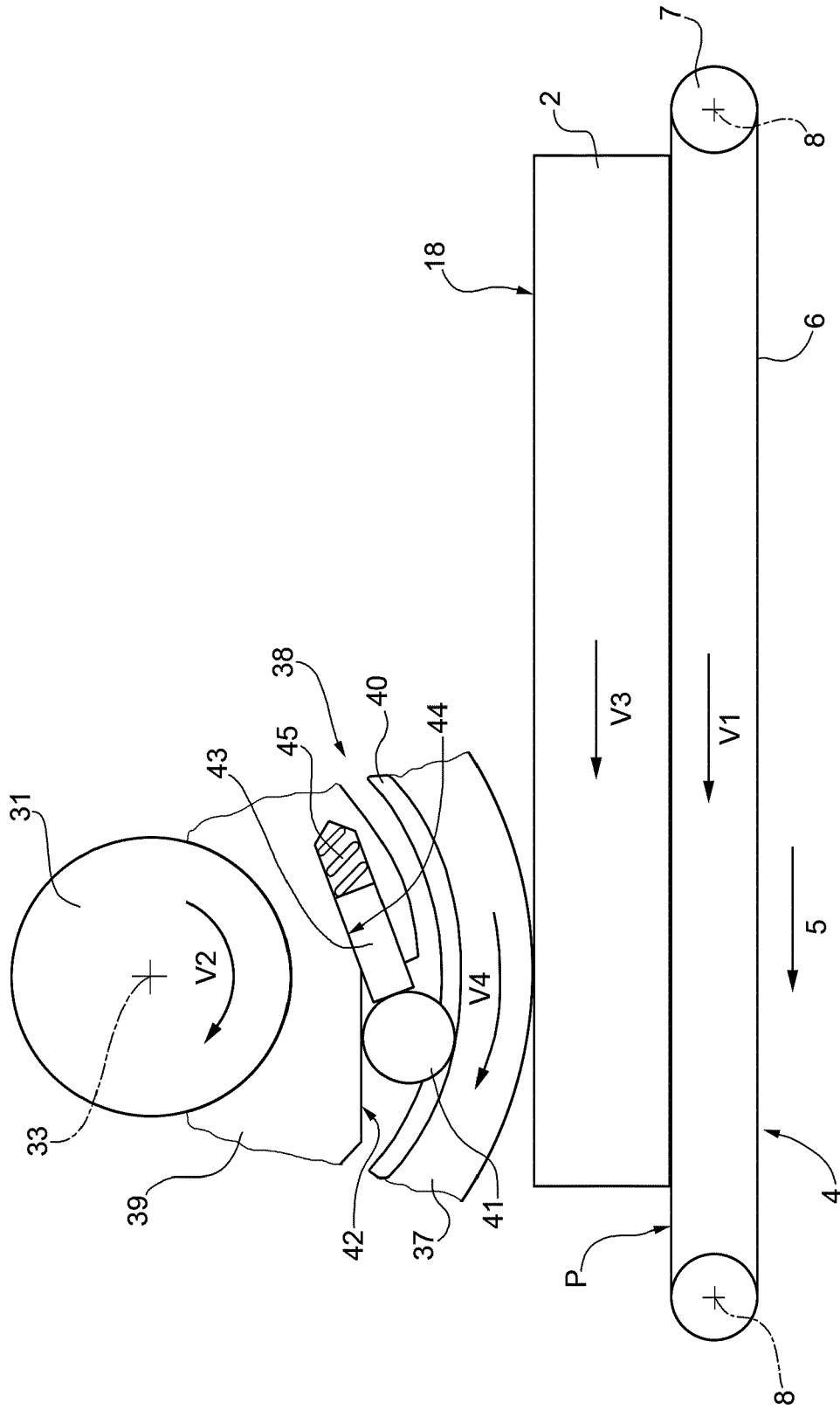


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
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EPO FORM 1503 03.82 (P04C01)

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 3 305 467 A1 (VIET ITALIA S R L CON UNICO SOCIO [IT]) 11 April 2018 (2018-04-11) * abstract; figures 1-3 *	1-10	INV. B24B7/06 B24B21/08 B24B21/18 B24B7/28 B23Q35/12 B23Q15/20
A	US 3 455 066 A (ESTABROOK MARK R) 15 July 1969 (1969-07-15) * column 1, lines 25-40; figures 1-3 * * column 2, lines 35-62 *	1-10	
A	US 5 720 648 A (GREEN GARY L [US] ET AL) 24 February 1998 (1998-02-24) * columns 1,2 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			B24B B23Q
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 14 April 2021	Examiner Herrero Ramos, J
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14-04-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3305467	A1	11-04-2018	NONE
US 3455066	A	15-07-1969	NONE
US 5720648	A	24-02-1998	NONE

REFERENCES CITED IN THE DESCRIPTION

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