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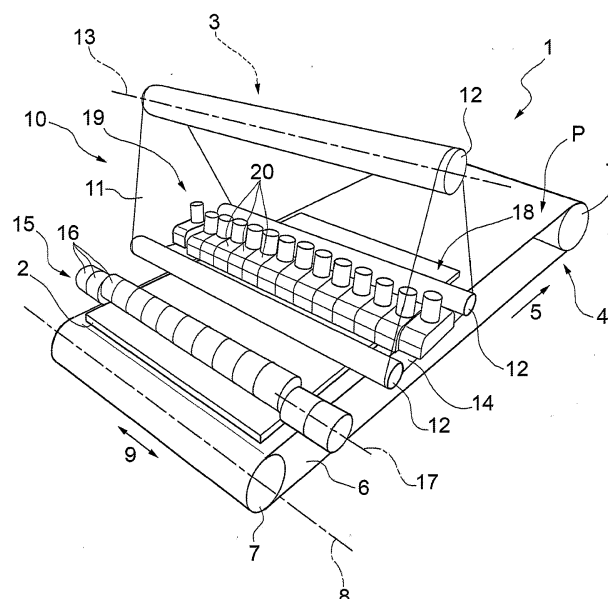
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BA ME**KH MA MD TN**(71) Applicant: **Viet Italia S.r.l.****61122 Pesaro (IT)**(72) Inventor: **BALDUCCI, Fabio****60015 Falconara Marittima (AN) (IT)**(74) Representative: **Manconi, Stefano et al****Studio Torta S.p.A.****Via Viotti, 9****10121 Torino (IT)**(30) Priority: **16.12.2019 IT 201900004572 U**(54) **SANDING MACHINE FOR SANDING/FINISHING PANELS MADE OF WOOD, METAL OR THE LIKE**

(57) In a sanding machine for sanding/finishing panels (2) made of wood, metal or the like, an abrasive belt (11) is moved so as to come into contact with a panel (2) by a plurality of thrust elements (20), which are distributed inside the abrasive belt (11) and are moved perpendicularly to the panel (2) by respective actuator cylinders (22), each having an output rod (27), which is movable

between a lowered operating position, due to the thrust of two pneumatic circuits selectively connected, in a continuous manner, to an upper chamber (30) of the actuator cylinder (22), and a raised rest position, due to the thrust of a further pneumatic circuit selectively connected to a lower chamber (31) of the actuator cylinder (22).

37**FIG.1****EP 3 838 481 A1**

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application of utility model no. 202019000004572 filed on 16/12/2019.

TECHNICAL FIELD

[0002] The invention relates to a sanding machine for sanding/finishing panels made of wood, metal or the like.

BACKGROUND ART

[0003] In the field of sanding/finishing panels made of wood, metal or the like, a sanding machine is known, which comprises a conveyor belt, which has an upper transport branch defining a substantially horizontal support surface for at least one panel and is designed to feed the panel in a first direction; a sanding device, which is mounted above the support surface so as to sand an upper face of the panel; and a detection device to detect a width of the panel in a second direction, which is parallel to the support surface and transverse to the first direction.

[0004] The sanding device comprises an abrasive belt, which is wound in a ring shape around a plurality of idler rollers, and a plurality of thrust elements, which are distributed inside the abrasive belt in the second direction and are movable independently of one another in a third direction, which is orthogonal to the support surface, between respective lowered operating positions, in which the corresponding portions of abrasive belt are moved so as to come into contact with the upper face of the panel, and respective raised rest position, in which the corresponding portions of abrasive belt disengage the upper portion of the panel.

[0005] The thrust elements are fixed to the output rods of respective pneumatic actuator cylinders and are selectively moved to their lowered operating position depending on the width of the panel and/or on the processing to be carried out.

[0006] Each actuator cylinder comprises a cylinder, which is engaged by the relative output rod in a sliding manner and is divided by the output rod into an upper chamber and a lower chamber.

[0007] The lower chamber can selectively be connected to a first pneumatic circuit through the interposition of a supply solenoid valve and the upper chamber is connected to a second pneumatic circuit in a continuous manner.

[0008] As a consequence, each thrust element is normally arranged in its lowered operating position and is selectively moved to its raised rest portion following the activation of the relative supply solenoid valve.

[0009] The actuator cylinder further comprises a first annular gasket, which is mounted on the output rod so as to separate the lower chamber from the upper cham-

ber in a fluid-tight manner, a second annular gasket, which is mounted on the output rod so as to separate the upper chamber from the lower chamber in a fluid-tight manner, and a third annular gasket, which is mounted on the output rod so as to separate the lower chamber from the outside in a fluid-tight manner.

[0010] The first annular gasket is a lip gasket designed to radially expand due to the thrust of the first pneumatic circuit and the second annular gasket is a lip gasket designed to radially expand due to the thrust of the second pneumatic circuit.

[0011] The detection device normally comprises a plurality of contact rollers, which are distributed above the support surface in the second direction and are mounted so as to rotate around respective rotation axes, which are parallel to the second direction.

[0012] Following the movement of the panel in the first direction, the contact rollers arranged inside the moving path of the panel are lifted from the panel so as to allow the detection device to detect the width of the panel in the second direction.

[0013] Known sanding machines for sanding/finishing panels made of wood, metal or the like of the type described above are affected by some drawbacks, which are mainly due to the fact that each thrust element is moved to its lowered operating position by the air under pressure conveyed along the second pneumatic circuit, thus exerting one single, constant sanding force upon the panel and ensuring, as a consequence, to the sanding machine a relatively small flexibility.

DISCLOSURE OF INVENTION

[0014] The object of the present invention is to provide a sanding machine for sanding/finishing panels made of wood, metal or the like, which does not suffer from the drawbacks described above and is simple and economic to be manufactured.

[0015] According to the invention, there is provided a sanding machine for sanding/finishing panels made of wood, metal or the like according to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention will now be described with reference to the accompanying drawings, which show a non-limiting embodiment thereof, wherein:

figure 1 is a schematic perspective view, with parts removed for greater clarity, of a preferred embodiment of the sanding machine according to the invention; and

figure 2 is a schematic longitudinal section of a detail of the sanding machine of figure 1.

BEST MODE FOR CARRYING OUT THE INVENTION

[0017] 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 with a substantially parallelepiped-like shape.

[0018] The sanding machine 1 comprises a support frame 3 and a feeding device 4, which is mounted on the support frame 3 so as to move the panels 2 one after the other in a horizontal direction 5.

[0019] The device 4 comprises a conveyor belt 6, which has an upper transport branch defining a horizontal support surface P for the panel 2 and is wound in a ring shape around a pair of motor-driven pulleys 7, which are mounted so as to rotate, relative to the frame 3, around respective longitudinal axes 8, which are parallel to one another and to a horizontal direction 9, which is transverse to the direction 5.

[0020] The sanding machine 1 further comprises a sanding unit 10 comprising, in turn, an abrasive belt 11, which is wound in a ring shape around a plurality of idler rollers 12 (in particular, three rollers 12), which are mounted so as to rotate around respective longitudinal axes 13 parallel to the direction 9 and are arranged so as to give the belt 11 a substantially triangular configuration.

[0021] In particular, the arrangement of the rollers 12 is such that the belt 11 has a lower branch 14, which is substantially flat and parallel to the plane P.

[0022] The sanding machine 1 is further provided with a detection device 15, which is mounted above and on the input side of the surface P in order to detect a width of the panel 2 in the direction 9.

[0023] In particular, the device 15 is a mechanical detection device comprising a plurality of contact rollers 16, which are distributed above the plane P in the direction 9 and are mounted so as to rotate around respective rotation axes 17, which are parallel to the direction 9.

[0024] Following the movement of the panel 2 in the direction 5, the contact rollers 16 arranged inside the moving path of the panel 2 are lifted from the panel 2 so as to allow the detection device 15 to detect the width of the panel 2 in the direction 9.

[0025] According to a variant which is not shown herein, the rollers 16 are eliminated and replaced by a detection device which is not in contact with the panels 2, for example an optical, inductive or capacitive device.

[0026] The lower branch 14 of the belt 11 is selectively moved so as to come into contact with an upper face 18 of the panels 2 by a thrust device 19, which is mounted inside the belt 11.

[0027] The device 19 comprises, in particular, a plurality of thrust elements 20, which are distributed inside the belt 11 in the direction 9, are mounted above the branch 14 and are movable independently of one another in a vertical direction 21, which is orthogonal to the directions 5 and 9 and perpendicular to the surface P.

[0028] Each element 20 is movable in the direction 21 between a lowered operating position, in which the corresponding portion of the belt 11 is moved so as to come into contact with the face 18, and a raised rest position, in which the corresponding portion of the belt 11 is dis-

engaged from the face 18.

[0029] According to figure 2, each element 20 is moved between its lowered operating position and its raised rest position by a relative actuator cylinder 22 comprising a cylinder 23, which has a substantially vertical longitudinal axis 24 and is configured so as to define a wide upper portion 25 and a narrow lower portion 26.

[0030] The element 20 has the shape of a plate fixed to the free end of an output rod 27 of the actuator cylinder 22 crosswise to the axis 24 and is coupled to the cylinder 23, in a sliding and angularly fixed manner, by means of at least one coupling pin 28 projecting upwards from the element 20 parallel to the direction 21.

[0031] The rod 27 is engaged in the narrow lower portion 26 in a sliding manner and coaxially to the axis 24, projects downwards from the cylinder 23 in the direction 21 and is provided with a plate 29, which is engaged in the wide upper portion 25 in a sliding manner and divides the cylinder 23 into an upper chamber 30 and a lower chamber 31.

[0032] The chamber 30 is continuously connected to a first pneumatic circuit (not shown), which is configured to feed compressed air at a first pressure into the chamber 30, or to a second pneumatic circuit (not shown), which is configured to feed compressed air at a second pressure, which is different from the first pressure, into the chamber 30.

[0033] The chamber 30 is selectively connected to the first pneumatic circuit or to the second pneumatic circuit by means of a supply solenoid valve 32 so as to selectively control the sanding force exerted by the element 20 and, hence, by the belt 11 upon the panels 2.

[0034] The chamber 31 can selectively be connected, by means of a supply solenoid valve 33, to a third pneumatic circuit (not shown), which is configured to feed compressed air into the chamber 31 and move the element 20 to its raised rest position.

[0035] With regard to the description above, it should be pointed out that the pressure of the compressed air fed into the chamber 30 is, in any case, smaller than the pressure of the compressed air fed into the chamber 31.

[0036] The actuator cylinder 22 further comprises a first annular gasket 34, which is mounted on the rod 27 so as to separate the chamber 30 from the chamber 31 in a fluid-tight manner, a second annular gasket 35, which is mounted on the rod 27 so as to separate the chamber 31 from the chamber 30 in a fluid-tight manner, and a third annular gasket 36, which is mounted on the rod 27 so as to separate the chamber 31 from the outside in a fluid-tight manner.

[0037] The gasket 34 is a lip gasket, which is designed to radially expand due to the thrust of the compressed air fed into the chamber 30 by the first pneumatic circuit (not shown) or by the second pneumatic circuit (not shown), and the gasket 35 is a lip gasket, which is designed to radially expand due to the thrust of the compressed air fed into the chamber 31 by the third pneumatic circuit (not shown).

[0038] The solenoid valve 33 is normally arranged in an opening position, in which the compressed air fed into the chamber 31 exerts, upon the rod 27, a pneumatic force that is greater than the sum of a pneumatic force exerted upon the rod 27 by the compressed air fed into chamber 30 and of a friction force exerted upon the rod 27 by the gaskets 34, 35, 36.

[0039] In use:

when the solenoid valve 33 is open, the element 20 is moved to its raised rest position; and when the solenoid valve 33 is energized and moved to a closing position, the chamber 31 is connected to the outside, the pneumatic force generated by the chamber 31 is substantially zero, the friction force generated by the gaskets 34, 35, 36 is relatively small and the element 20 is moved from its raised rest position to its lowered operating position by the compressed air fed into the chamber 30.

[0040] In other words, when the solenoid valve 33 is closed, compressed air is fed to the sole chamber 30 and, therefore, the element 20 is moved to its lowered operating position with a relatively small pneumatic force, which is greater than the relatively small friction force exerted upon the rod 27 by the gaskets 34, 35 and 36.

[0041] The machine 1 is further provided with an electronic control unit 37, which communicates with the rollers 16 and with the solenoid valves 32 and 33 of each actuator cylinder 22.

[0042] The unit 37 is configured so as to receive, from the rollers 16, information concerning the detection of the width of each panel 2 in the direction 9 and so as to control the operation of the solenoid valve 32 in order to select the sanding force exerted by each thrust element 20 upon the corresponding portion of abrasive belt 11.

Claims

1. A sanding machine for sanding/finishing panels (2) made of wood, metal or the like, the sanding machine comprising a feeding device (4), which defines a support surface (P) for at least one panel (2) and is designed to feed the panel (2) in a first direction (5); a sanding device (10), which is mounted above the support surface (P) and comprises, in turn, an abrasive belt (11), which is wound in a ring shape around a plurality of idler rollers (12) so as to sand an upper face (18) of the panel (2); a plurality of thrust elements (20), which are distributed inside the abrasive belt (11) in a second direction (9), which is transverse to the first direction (5) and parallel to the support surface (P); and, for each thrust element (20), a respective actuator cylinder (22) to move the thrust element (20) between a lowered operating position, in which the thrust element (20) moves the abrasive belt (11) so as to cause it to come into contact with

the upper face (18) of the panel (2), and a raised rest position; each actuator cylinder (22) comprising a cylinder (23), an output rod (27), which is engaged in the cylinder (23) in a sliding manner and is configured to divide the cylinder (23) into an upper chamber (30) and a lower chamber (31), a first pneumatic circuit communicating with the upper chamber (30) so as to move the thrust element (20) to its lowered operating position with a first sanding force, and a second pneumatic circuit communicating with the lower chamber (31) so as to move the thrust element (20) to its raised rest position; and being **characterized in that** each actuator cylinder (22) further comprises a third pneumatic circuit communicating with the upper chamber (30) so as to move the thrust element (20) to its lowered operating position with a second sanding force, which is different from the first sanding force, and a first supply solenoid valve (32) to selectively connect the upper chamber (30) to said first and third pneumatic circuits; an electronic control unit (37) being provided in order to selectively control the operation of the first supply solenoid valve (32).

2. A sanding machine according to claim 1 and further comprising a detection device (15) to detect a size of the panel (2) in the second direction (9); the detection device (15) comprising, for each thrust element (20), a respective contact member (16), which is designed to come into contact with the panel (2) following the feeding of the panel (2) in the first direction (5).

3. A sanding machine according to claim 2, wherein the electronic control unit (37) communicates with each contact member (16) and with the first supply solenoid valve (32) of the actuator cylinder (22) of the relative thrust element (20) so as to selectively connect the relative upper chamber (30) to the first pneumatic circuit or to the third pneumatic circuit in response to a signal coming from the contact member (16).

4. A sanding machine according to any one of the preceding claims, wherein the first supply solenoid valve (32) of each actuator cylinder (22) is configured to continuously connect the upper chamber (30) to the first pneumatic circuit or to the third pneumatic circuit.

5. A sanding machine according to any one of the preceding claims, wherein each actuator cylinder (22) further comprises a second supply solenoid valve (33) to selectively connect the lower chamber (31) to the second pneumatic circuit.

6. A sanding machine according to claim 5, wherein the second supply solenoid valve (33) is movable between an opening position, in which the lower

chamber (31) communicates with the second pneumatic circuit, and a closing position, in which the lower chamber (31) communicates with the outside.

7. A sanding machine according to any one of the preceding claims, wherein each actuator cylinder (22) further comprises a first annular gasket (34) to separate the upper chamber (30) from the lower chamber (31) in a fluid-tight manner, a second annular gasket (35) to separate the lower chamber (31) from the upper chamber (30) in a fluid-tight manner, and a third annular gasket (36) to separate the lower chamber (31) from the outside in a fluid-tight manner. 5 10
8. A sanding machine according to claim 7, wherein said first, second and third annular gaskets (34, 35, 36) are mounted on the output rod (27). 15
9. A sanding machine according to claim 7 or 8, wherein the first annular gasket (34) is a lip gasket designed to radially expand due to the thrust of the first pneumatic circuit or of the third pneumatic circuit, and wherein the second annular gasket (35) is a lip gasket designed to radially expand due to the thrust of the second pneumatic circuit. 20 25

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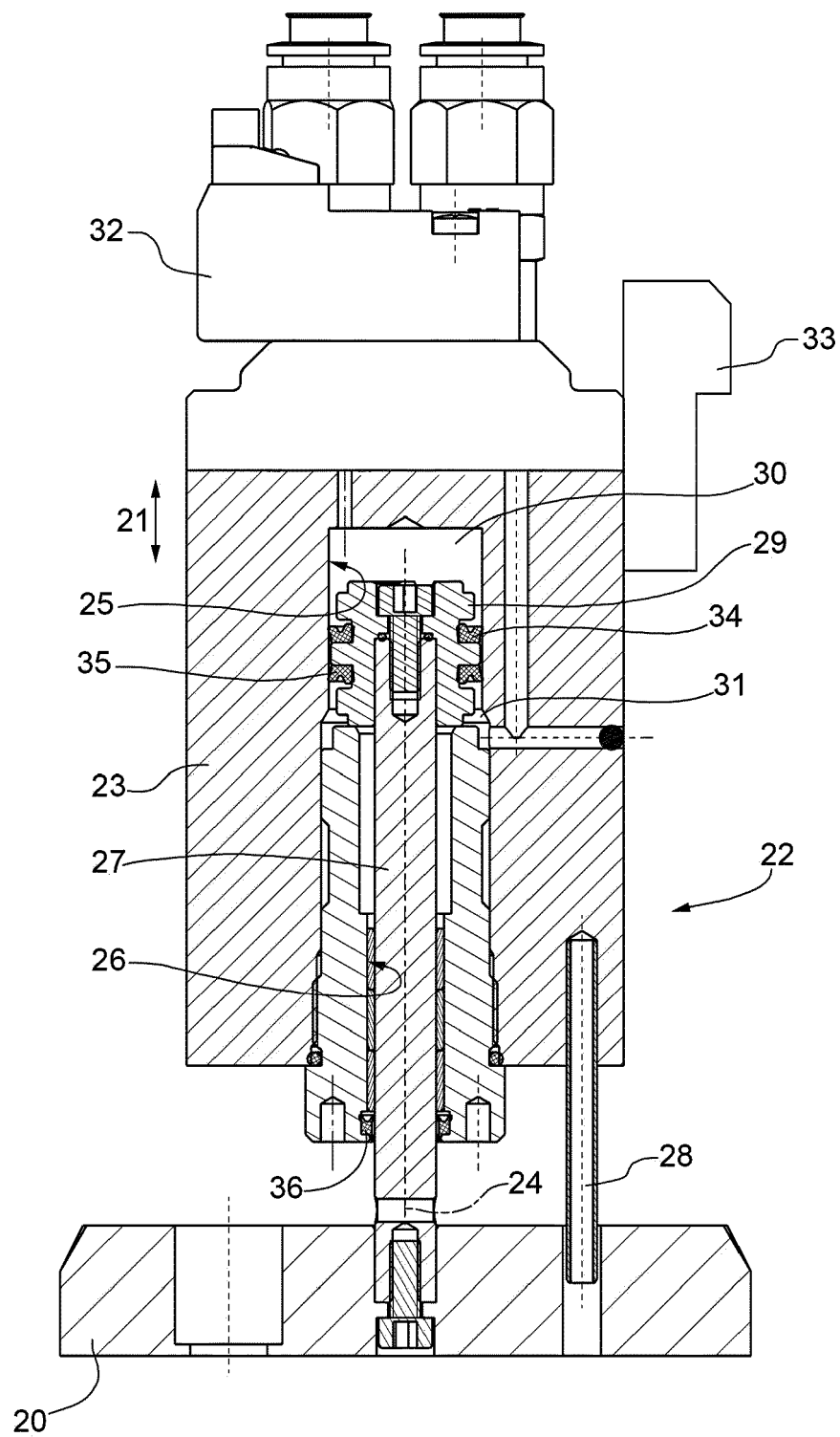


FIG.2



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 21 4758

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 April 2021	Examiner Koller, Stefan
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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 21 4758

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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28-04-2021

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