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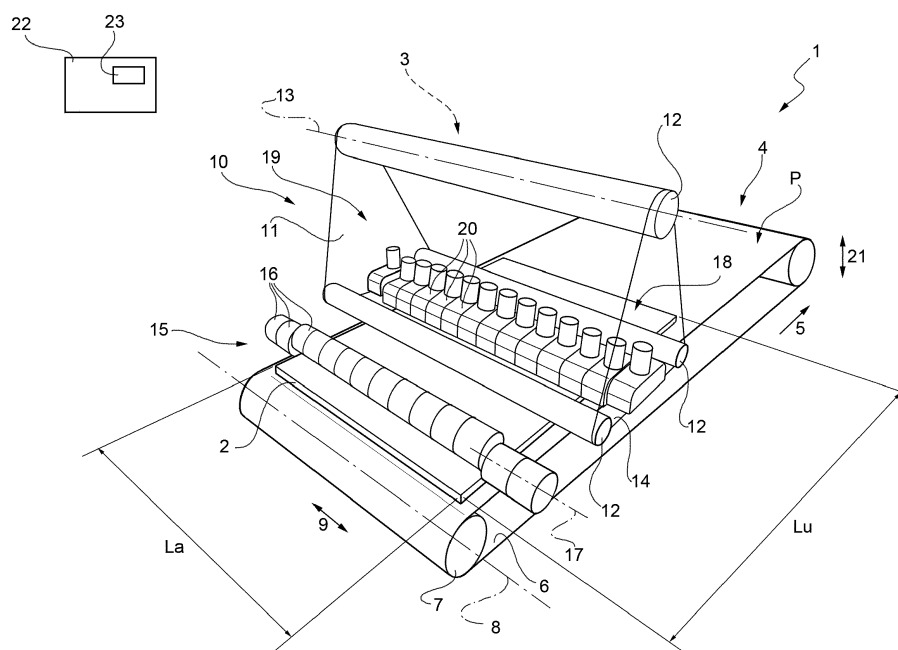
Method and machine to sand wood panels or the like

(57)

A method to sand wood panels (2) or the like by means of an abrasive belt (11), which is wound in a ring shape around a plurality of idler rollers (12), and is moved by a plurality of thrust elements (20) distributed inside the abrasive belt (11) so as to come into contact with an upper face (18) of a panel (2); the method providing storing, in a memory (23) of an electronic control unit (22),

data concerning a pattern (24) to be reproduced on the upper face (18) of the panel (2) by means of the abrasive belt (11), and controlling, by means of the electronic control unit (22), the selective lowering movement of the thrust elements (20) as a function of the data stored in the memory (23) of the electronic control unit (22) itself.

FIG. 1



Description

[0001] The present invention relates to a method to sand wood panels or the like.

[0002] It is known in the field of sanding wood panels or the like, to provide a sanding machine of the type comprising a conveyor belt, which has an upper conveyor branch defining a substantially horizontal support surface for at least one panel, and is suited to feed the panel in a given first direction; a sanding device, which is mounted above the support surface and comprises, in turn, an abrasive belt, which is wound in a ring shape around a plurality of idler rollers 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.

[0003] The sanding machine further comprises a plurality of thrust elements, which are distributed inside the abrasive belt in the second direction, and are independently mobile in a third direction which is orthogonal to the support surface between respective lowered operating positions, in which the corresponding portions of the abrasive belt are moved so as to bring them into contact with the upper face of the panel, and respective raised rest positions.

[0004] The thrust elements are selectively moved in the lowered operating positions thereof as a function of the width of the panel.

[0005] Since the thrust elements lowered as a function of the width of the panel are all kept in their lowered operating positions for the entire sanding step of the upper face of the panel, known sanding machines of the type described above are only capable of sanding the upper face of the panel in a uniform and homogeneous manner, and therefore have reduced processing flexibility and versatility.

[0006] It is the object of the present invention to provide a method to sand wood panels or the like, which is exempt from the above-described drawbacks and is simple and cost-effective to implement.

[0007] According to the present invention, there is provided a method to sand wood panels or the like, as claimed in claims from 1 to 11.

[0008] The present invention also relates to a sanding machine to sand wood panels or the like.

[0009] According to the present invention, there is provided a sanding machine to sand wood panels or the like, as claimed in claim 12.

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

figure 1 is a perspective diagrammatic view, with parts removed for clarity, of a preferred embodiment of the sanding machine of the present invention; and figure 2 shows four different operating modes of the sanding machine in figure 1.

[0011] With reference to figure 1, numeral 1 indicates, as a whole, a sanding machine to sand wood panels 2 or the like, which are substantially parallelepiped in shape.

[0012] The sanding machine 1 comprises a support frame 3, and a feeding device 4 mounted on the frame 3 to feed the panels 2 in succession in a horizontal direction 5.

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

[0014] 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 the case in point, three rollers 12), which are mounted to rotate around respective longitudinal axes 13, which are parallel to direction 9, and are arranged so as to give belt 11 a substantially triangular-shaped cross section.

[0015] In other words, belt 11 has a substantially flat lower branch 14 which is parallel to surface P.

[0016] The sanding machine 1 comprises a detection device 15 mounted above and at the entrance of surface P to detect a width of panel 2 in direction 9.

[0017] In the case in point, device 15 is a mechanical detection device comprising a plurality of contact rollers 16, which are distributed above surface P in direction 9, and are mounted to rotate around respective rotation axes 17 which are parallel to direction 9 itself.

[0018] Following the feeding of panel 2 in direction 5, the rollers 16 arranged inside the feeding path of panel 2 are raised by panel 2 itself so as to allow device 15 to detect width La in direction 9.

[0019] According to a variant not shown, the rollers 16 are eliminated and replaced with an optical detection device.

[0020] The lower branch 14 of belt 11 is selectively brought into contact with an upper face 18 of the panels 2 by a thrust device 19 mounted inside belt 11.

[0021] Device 19 comprises, in the case in point, a plurality of thrust blocks 20, which are distributed inside belt 11 in direction 9, are mounted above branch 14, and are independently mobile in a vertical direction 21 which is orthogonal to the directions 5 and 9 and perpendicular to surface P.

[0022] Each block 20 is moved in direction 21 between a lowered operating position, in which the corresponding portion of belt 11 is moved to come into contact with face 18, and a raised rest position.

[0023] The sanding machine 1 further comprises an electronic control unit 22 provided with a memory 23 and configured to control the sanding unit 10 and the thrust device 19 according to the following operating modes.

[0024] All operating modes, which will be better described below, provide storing, in memory 23 of unit 22, data concerning a pattern 24 to be reproduced on the upper face 18 of panel 2 by means of the abrasive belt 11, detecting width La of panel 2 in direction 9, and determining the blocks 20 to be moved between the relative lowered operating positions and the relative raised rest positions as a function of width La and of the data stored in memory 23.

[0025] The data stored in memory 23 consist of an image captured by means of scanner, of an image created outside of the line, or of a time sequence of lowering and raising movements of each block 20. The data concerning pattern 24 are stored in memory 23 before panel 2 is sanded.

[0026] Once the data concerning pattern 24 are stored in memory 23, the control unit 22 controls, while panel 2 is fed in direction 5, the selective lowering and raising movements of the blocks 20 involved in the processing as a function of the data stored in memory 23 so as to allow belt 11 to reproduce pattern 24 on face 18.

[0027] The selective lowering and raising movements of the blocks 20 are obviously also controlled as a function of a feeding speed of panel 2 in direction 5.

[0028] In particular, the data concerning pattern 24, which are stored in memory 23, are processed by unit 22 as a function of width La of panel 2.

[0029] According to the operating modes shown in figures 2a and 2b, the data stored in memory 23 are processed by unit 22 as a function of width La of panel 2 to adjust pattern 24 to face 18 of panel 2 in direction 9.

[0030] According to the operating mode shown in figure 2a, pattern 24 is decreased to width La when panel 2 has a smaller width La than the width of pattern 24 in direction 9.

[0031] According to the operating mode shown in figure 2b, pattern 24 is extended to width La when panel 2 has a larger width La than the width of pattern 24 in direction 9.

[0032] According to the operating mode shown in figure 2c, the data stored in memory 23 are processed by unit 22 as a function of width La of panel 22 to cut off pattern 24 at width La when panel 2 has a smaller width La than the width of pattern 24 in direction 9.

[0033] According to the operating mode shown in figure 2d, the data stored in memory 23 are processed by unit 22 as a function of width La of panel 2 to replicate pattern 24 on face 18 of panel 2 in direction 9.

[0034] When length Lu of panel 2 in direction 5 is stored in memory 23, the data stored in memory 23 are processed by unit 22 both as a function of width La and as a function of length Lu.

[0035] In particular, the data stored in memory 23 are processed as a function of the length Lu stored so as to adjust pattern 24 to face 18 of panel 2 in direction 5, or to replicate pattern 24 on face 18 of panel 2 in direction 5 itself.

[0036] According to a further operating mode, the feed-

ing speed of belt 11 is varied by unit 22 while the selective lowering movement of the blocks 20 is being controlled, so as to vary the degree of abrasion of face 18 of panel 2 at pattern 24.

[0037] According to a variant not shown, the abrasive belt 11 is wound in a ring shape around a pair of pulleys 7, which are arranged with the axes 8 thereof parallel to direction 5.

[0038] Storing the data concerning pattern 24 in memory 23 of unit 22 allows selectively operating the blocks 20 so as to selectively - and no longer only in a uniform homogeneous manner - sand the upper face 18 of panel 2, thus customizing it with pattern 24 stored in memory 23 each time.

Claims

1. A method to sand wood panels (2) or the like in a sanding machine comprising a feeding device (4), which defines a support surface (P) for at least one panel (2), and is suited to feed the panel (2) in a given 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 are mobile between respective lowered operating positions, in which the thrust elements (20) move the abrasive belt (11) so as to bring it into contact with the upper face (18) of the panel (2), and respective raised rest positions; and an electronic control unit (22) to control the operation of the sanding machine; the method being **characterized by** comprising the steps of:

storing, in a memory (23) of the electronic control unit (22), data concerning a pattern (24) to be reproduced on the upper face (18) of the panel (2) by means of the abrasive belt (11); and controlling, by means of the electronic control unit (22), the selective lowering movement of the thrust elements (20) as a function of the data stored in the memory (23) of the electronic control unit (22).

2. A method according to claim 1, wherein the data stored consist of an image captured by means of scanner or an image created outside of the line.

3. A method according to claim 1, wherein the data stored consist, for each thrust element (20), of a respective time sequence of lowering and raising movements.

4. A method according to any of the previous claims, wherein the step of controlling the selective lowering movement of the thrust elements (20) is performed as a function of a feeding speed of the panel (2) in the first direction (5). 5
5. A method according to any of the previous claims, wherein the sanding machine comprises, furthermore, a detection device (15), which is arranged upstream of the sanding device (10) in the first direction (5) so as to detect the width (La) of the panel (2) in the second direction (9); the method comprising the step of: 10

processing the data stored, by means of the electronic control unit (22), as a function of the detected width (La) of the panel (2). 15
6. A method according to claim 5, wherein the data stored are processed as a function of the width (La) detected so as to adjust the pattern (24) to the upper face (18) of the panel (2) in the second direction (9). 20
7. A method according to claim 5, wherein the data stored are processed as a function of the width (La) detected so as to cut off the pattern (24) at the detected width (La). 25
8. A method according to claim 5, wherein the data stored are processed as a function of the width (La) detected so as to replicate the pattern (24) on the upper face (18) of the panel (2) in the second direction (9). 30
9. A method according to any of the previous claims and comprising, furthermore, the steps of: 35

storing, in the memory (23) of the electronic control unit (22), the length (Lu) of the panel (2) in the first direction (5); and 40

processing the data stored, by means of the electronic control unit (22), as a function of the stored length (Lu) of the panel (2).
10. A method according to claim 9, wherein the data stored are processed as a function of the length (Lu) stored so as to adjust the pattern (24) to, or replicate the pattern (24) on, the upper face (18) of the panel (2) in the first direction (5). 45

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11. A method according to any of the previous claims and comprising, furthermore, the step of: 55

varying, by means of the electronic control unit (22), the feeding speed of the abrasive belt (11) while the selective lowering movement of the thrust elements (20) is being controlled, so as to vary the degree of abrasion of the upper face (18) of the panel (2) in correspondence to the pattern (24).
12. A sanding machine to sand wood panels (2) or the like comprising a feeding device (4), which defines a support surface (P) for at least one panel (2), and is suited to feed the panel (2) in a given 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 are mobile between respective lowered operating positions, in which the thrust elements (20) move the abrasive belt (11) so as to bring it into contact with the upper face (18) of the panel (2), and respective raised rest positions; and an electronic control unit (22) to control the operation of the sanding machine; the electronic control unit (22) being configured to implement the method claimed in any of the claims from 1 to 11.

FIG. 1

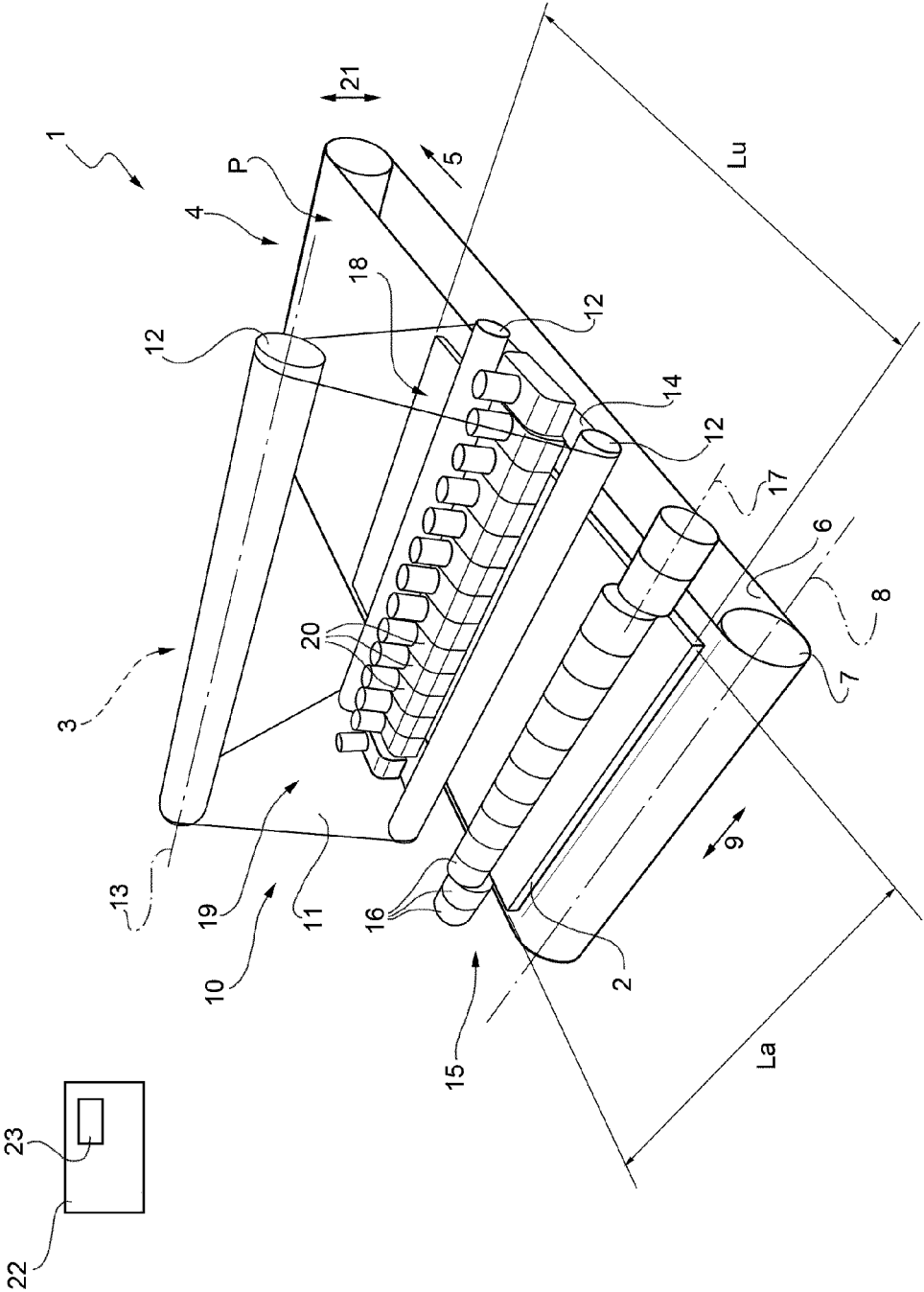


FIG. 2

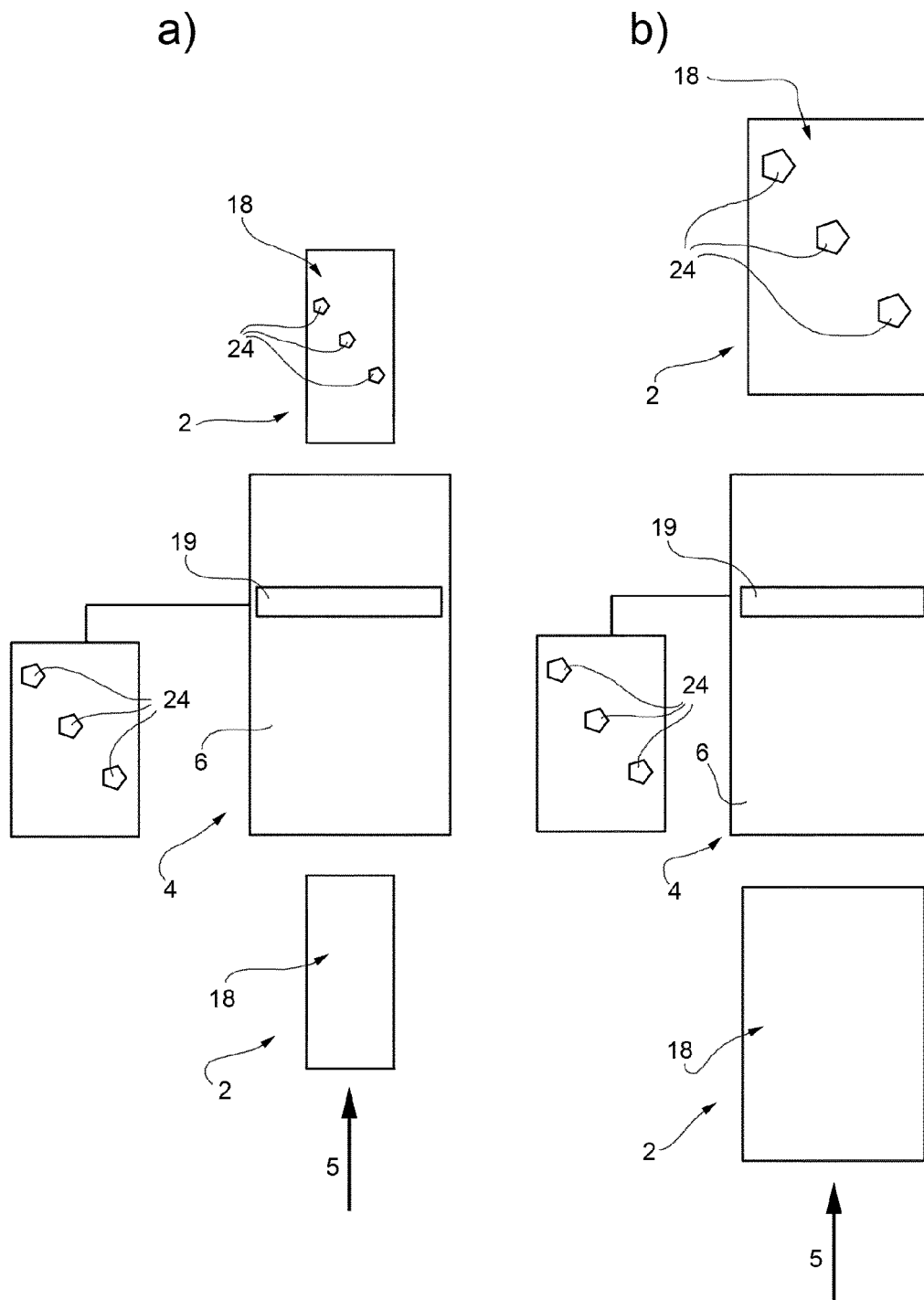
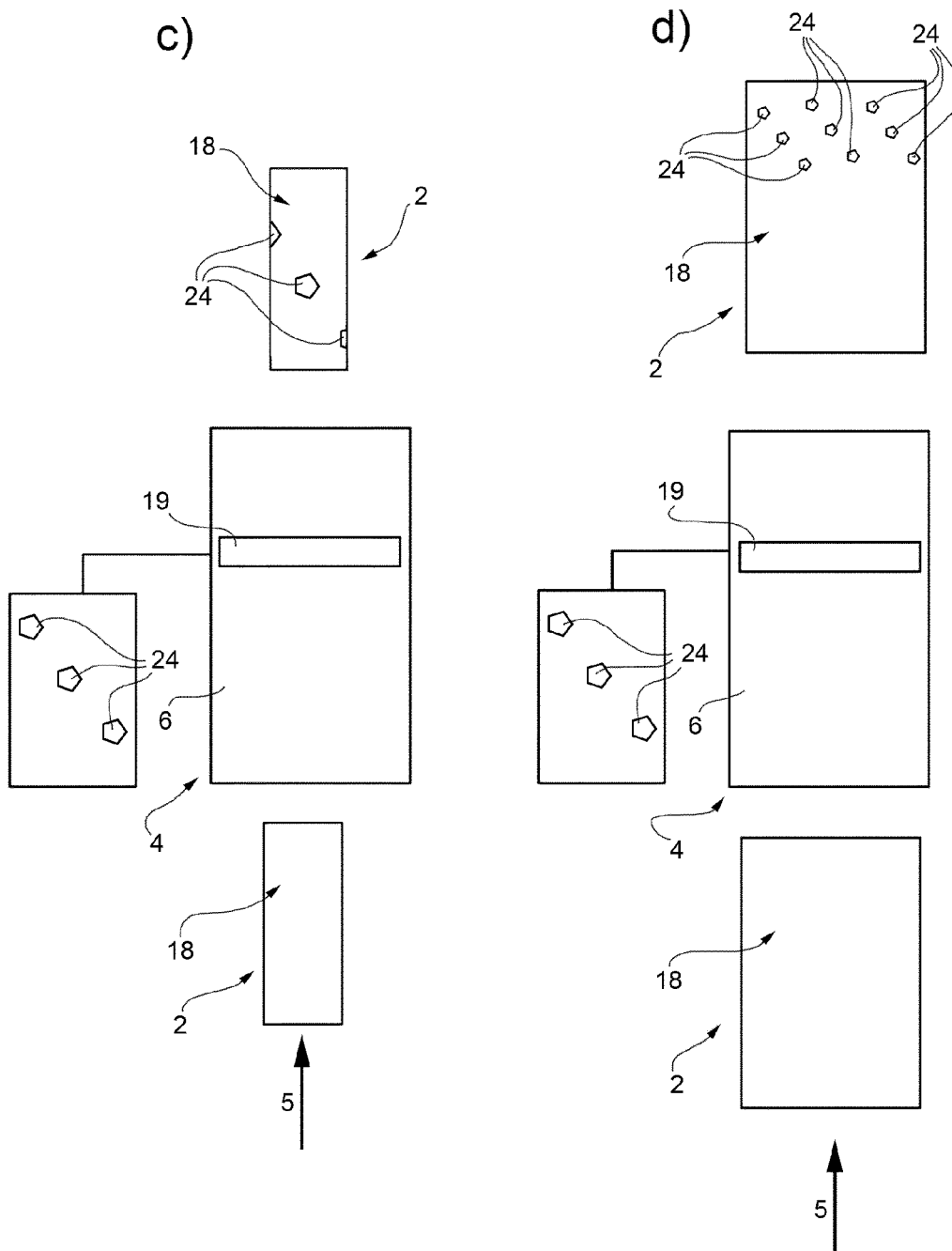


FIG. 2





EUROPEAN SEARCH REPORT

 Application Number
 EP 14 17 9947

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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 16 October 2014	Examiner Gelder, Klaus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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