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(54) **VACUUM COATING HEAD FOR COATING PANEL EDGES**

(57) Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1), said vacuum coating head being supplied by a vacuum tower (14) which provides to supplying and suctioning said painting product, said vacuum coating head (23) being **characterized in that** it comprises at least:

- a first dispensing nozzle (51) for dispensing said painting product;
- a first suction nozzle (52) for suctioning said painting product;
- a second dispensing nozzle (55) for dispensing said painting product;
- a second suction nozzle (56) for suctioning said painting product
- comprising at least a screed (53) protruding with respect to the vacuum coating head profile, said screed (53) being placed preferably between said first suction nozzle (52) and said second dispensing nozzle (55) for a painting product.

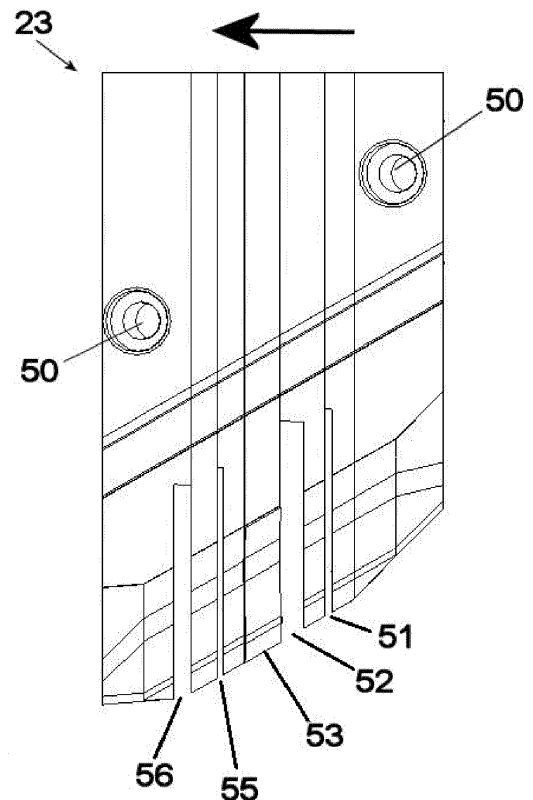


FIG. 5A

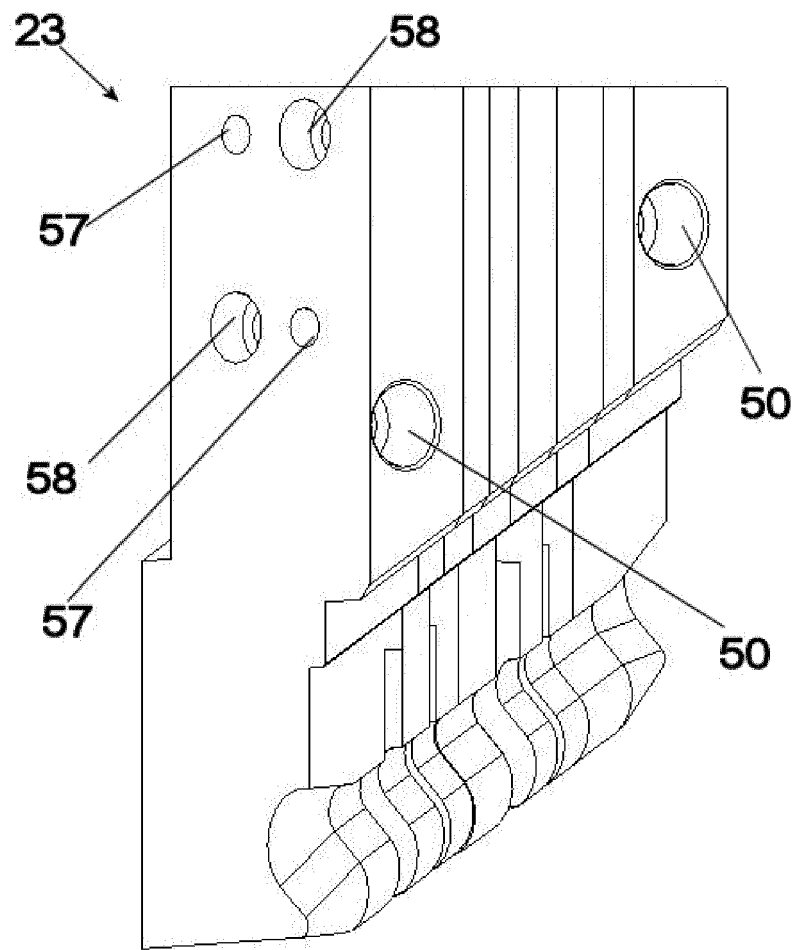


FIG. 5B

Description

[0001] The present invention relates to a device for coating rigid panels made of wood or other materials, like e.g. MDF (Medium Density Fibreboard) wood, fibreboard or other wooden materials, with liquid painting products. In particular, the present invention relates to a device (vacuum coating head) for evenly applying a fluid coating substance, in particular a painting product, on an external edge of a panel made of a rigid material with different shapes.

[0002] In the art, painting products comprising photopolymerizing agents activated by ultraviolet (UV) radiations are known. Such painting products comprise a plurality of monomers that, once activated by UV radiations emitted by lamps of suitable wavelength, are involved in a photopolymerizing process leading to the formation of a polymer network.

[0003] Mainly flat panel means a panel wherein two out of three dimensions are much wider than the third dimensions. Typically, the measures of such panels range 100x300x18 mm to 1250x2400x30 mm.

[0004] As known, such panels are coated in order to provide them with an aesthetic effect. E.g., in the case of fibreboard panels, i.e. a low-cost material, side coatings are applied so as to cover their uneven surface.

[0005] In a way known in the art, such coating is applied through a coating device making use of suction, of the kind comprising a coating head (vacuum coating head) provided with a chamber fed with a liquid painting product to be applied on the wooden panels.

[0006] The chamber of each vacuum coating head typically is provided with an opening shaped according to the shape of the transversal section of the panels to be coated. In particular, the opening is counter-shaped to the transversal profile of the panel edge. The opening is placed aligned along a conveying direction of the panel, corresponding to the longitudinal profile of the edge to be coated.

[0007] During the conveying of said panel, the panel edge is conveyed near said opening, which feeds the liquid painting product through an output slot for said liquid painting product. Said slot defines a nozzle that at least partially follows the transversal perimeter of the panel edge, at a constant distance, so as to lap the whole surface to be coated.

[0008] The dispensing slot is adjacent to at least one suction opening, provided for suctioning the liquid painting product, so as to prevent that said painting product can leak out from the coating head.

[0009] In this way, the excess liquid painting product, which is not applied on the edge of the conveying panel, is recovered by the suctioning opening and channelled to a reservoir of the liquid painting product.

[0010] By adjusting: a) the viscosity of the liquid painting product; b) the flow rate through the dispensing slot; c) the conveying speed of said panel; d) the degree of vacuum provided by suction recovering the excess paint-

ing product, the thickness of the painting product applied on said panel is determined.

[0011] The known art coating devices, even if capable of quickly and efficiently applying the liquid painting product on the panel edge, are nonetheless affected by important drawbacks. Such drawbacks are mainly linked to the distribution of the painting product on panels having porous surfaces, as filling the unevenness of the panels with the liquid painting product while at the same time obtaining a suitable smooth surface is impossible.

[0012] In fact, given the porous and absorbing structure of some wooden panels, in particular the panels made of fibreboard, a relevant quantity of painting product must be applied in order to cover the uneven and porous structure of the fibreboard panel edge.

[0013] It is worth mentioning that the use of vacuum suction tends to raise wood fibres, which protrude outside the film of the applied painting product. In order to avoid this drawback, two strategies can be used: a) using a very thick layer of painting product, so as to cover the raised wood fibre; or alternatively b) sanding the coated edge. The first strategy leads to a high and costly consumption of painting product; the second strategy leads to a more complex coating machine, provided with a greater length due to the presence of many sanding groups.

[0014] The applicant has been producing machines provided with one or more vacuum coating heads for suction coating for a long time, one of which is e.g. described in EP3315210A1. Said application describes a vacuum coating head comprising a body, at least a top form and at least a lower form.

[0015] In the art, there are known also vacuum coating heads made of a plurality of adjacent plates, e.g. from IT102009901728856 of Makor.

[0016] DE10100518 of Joseph Schiele OHG describes a vacuum head for applying paint to the lateral edge faces of elongate work pieces with a liquid coating medium. The vacuum head comprises an adjustable coating head with a coating slot that extends in the direction of transport of the work piece. Said coating slot leads to a lateral slotted nozzle at the entry side of the work piece, said nozzle being adapted to the edge cross-section of the work piece and being connectable to a line for feeding the coating medium. In order to reduce the time needed to exchange and adjust the coating heads and to reduce the place required, at least one second lateral slotted nozzle leads to the coating slot at a distance to the lateral slotted nozzle and is likewise connectable to the line for feeding the coating medium.

[0017] ITFI20090093 of Makor SRL describes a vacuum head for applying paint, comprising a recessed area for housing an edge of a panel to be coated; said recessed area being provided with at least a coating slot for providing the liquid product in order to supply said liquid product on the edge of the panel, characterized in that it comprises a screeding organ of the liquid product, placed downstream said supplying organ, in order to uni-

formly distribute the liquid product on the whole edge and to remove a portion of the product in excess from the panel.

[0018] One of the vacuum coating head made of a plurality of plates currently produced by the applicant comprises:

1. a first suction nozzle;
2. a dispensing nozzle for a painting product oriented toward the panel edge;
3. a second suction nozzle;
4. a third suction nozzle;
5. a nozzle for providing compressed air;
6. a fourth suction nozzle.

[0019] Aim of the present invention is providing an apparatus and a method for suction coating through a vacuum coating head that is cheaper to produce and allows to obtain better results in terms of quality of the coated panel.

[0020] This object is achieved by an apparatus and a method having the features of the independent claims. Advantageous embodiments and refinements are specified in claims dependent thereon.

[0021] The vacuum coating head according to the present invention is provided with just four nozzles:

1. a first nozzle for dispensing a painting product;
2. a first suction nozzle for suctioning said painting product;
3. a second nozzle for dispensing said painting product;
4. a second suction nozzle for suctioning said painting product.

[0022] Substantially, with respect to the known art vacuum coating heads, two suction nozzles and the compressed air nozzle were dispensed with. Instead, the dispensing nozzles are doubled. In this way, an application of painting product comparable to that obtainable with the old six-nozzle vacuum coating head is obtained.

[0023] In a preferred embodiment, the vacuum coating head provided with two dispensing nozzles and two suction nozzles for a painting product is provided with its central portion (screed) placed between said first suction nozzle and said second dispensing nozzle; said screed leans on the panel edge. Said screed applies a pressure pressing the painting product into wood pores, so as to improve the final quality of the coated panel.

[0024] The preferred embodiment of the vacuum coating head according to the present invention is the one shown in Figures 5, comprising in this order:

- a first dispensing nozzle;
- a first suction nozzle;
- a screed;
- a second dispensing nozzle;
- a second suction nozzle.

[0025] To the skilled man it is obvious that the number of painting product dispensing nozzles and/or suction nozzles can be increased (e.g. producing a coating head provided with three dispensing nozzles and three suction nozzles), and also that the position of the screed can be varied with respect to the dispensing and suction nozzles.

[0026] In an embodiment, the vacuum coating head is obtained in the form of a plurality of plates. Such plates can be made of a metallic material, or a plastic material, or even a wooden material (phenolic wood).

[0027] In an alternative embodiment, the vacuum coating head according to the present invention is produced as one solid piece obtained through 3D printing, e.g. in a plastic material like epoxy resin, or in a metal material, e.g. aluminium or stainless steel.

[0028] It is worth noting that a vacuum head requires the presence of a vacuum tower providing and suctioning the painting product. A vacuum tower can feed one, two or even three vacuum heads.

[0029] The machine comprising one or more vacuum heads according to the present invention allows to obtain sundry advantages. E.g., in an apparatus applying four layers of painting product:

- a vacuum head feeding two coating heads can be dispensed with;
- two vacuum heads can be dispensed with;
- at least a UV drying group can be dispensed with (up to three drying groups according to the drying cycle) on the same apparatus;
- overall, the apparatus is at least 1 metre shorter; the apparatus can be up to 5 metres shorter according to the number of applied layers of painting product.

[0030] All this translates into an apparatus much cheaper to produce that provides a coating of outstanding quality.

[0031] Further advantages and properties of the present invention are disclosed in the following description, in which exemplary embodiments of the present invention are explained in detail based on the drawings:

- | | |
|---------------|---|
| Figure 1 | Examples of panels provided with different edges: undercut edge, Jpull edge, radius edge, in transversal section; |
| Figure 2 | Known art apparatus provided with four coating heads, top view; |
| Figure 3 | Apparatus according to the present invention configured for providing four painting product applications, top view; |
| Figure 4 | Known art vacuum coating head, front view; |
| Figure 5A, 5B | Vacuum coating head according to the present invention in front and axonometric view. |

[0032] For the sake of clarity, in this Description a vac-

uum tower, indicated in this Description with the numeral 14, means a unit providing both the painting product and the vacuum to the vacuum head.

[0033] Figure 1 shows a first mainly flat panel 1 provided with an undercut edge 2, a second mainly flat panel 1' provided with a Jpull edge 3, and a third mainly flat panel 1" provided with a radiate edge 4. Said Jpull edges are e.g. used in kitchen cabinet doors, as they allow to open said doors while their external surface is even, free of handles or doorknobs. Figure 1 is illustrative only, having the aim to show the plurality of different edges that can be coated by a vacuum coating head according to the present invention. There is provided a wide variety of edges that are not shown in Figure 1.

[0034] Any panel is provided with two main sides and four edges, each of which must be coated. Panel coating typically occurs in production lines comprising a plurality of apparatuses placed in series. According to the organization of the production line characteristic of each production plant, for coating each side and edge there can be provided a specific apparatus, and between said apparatuses there is provided a turning device allowing to provide the following apparatus with the side or edge to be coated by that specific apparatus. Alternatively, the same apparatus can paint the four edges: the panel 1 is conveyed four times inside the same apparatus. Alternatively, an apparatus according to the present invention coats the geometrically more complex edge, while one or further apparatus/es is/are provided for the coating of the geometrically less complex edges.

[0035] It is worth noting that the number of sanding groups placed downstream a drying group 16 is proportional to the degree of geometrical complexity of the panel edge 2, 3, 4. The more geometrically complex the edge (like e.g. the Jpull edge 3), the higher the number of sanding groups provided in the apparatus, in that each of them is adjusted to sand just one portion of said edge. The length of the apparatus varies proportionally to the number of groups. It is worth noting that in an apparatus provided with a high number of sanding groups, according to the kind of batch produced in a given moment, some sanding groups might be inactive during the production of that specific batch.

[0036] The structure of the apparatuses 410, 430 shown in Figures 2 and 3 is just one of many possible configurations. In this comparison, a known art apparatus 410 (Figure 2) provided with four vacuum coating heads, and an apparatus 430 (Figure 3) according to the present invention applying four layers of painting product are shown, in order to show a meaningful comparison in terms of apparatus length.

[0037] In the following Description, the known art apparatus 410 and the apparatus 430 are summarily described, just to show the place of the respective vacuum heads 13, 23 inside said apparatuses. However, the number of sanding groups downstream the drying group 16 is the same in Figures 2 and 3, so that a meaningful comparison is shown in terms of length of the appa-

tuses.

[0038] As explained above, the same apparatus can be used to coat the four edges of panels 1, 1', 1", one at a time.

[0039] Figure 2 shows a known art apparatus currently produced by the applicant, in a top view. The bold arrow shows the conveying direction of the panel 1, whose edges are coated, one at a time.

[0040] The known art apparatus 410 comprises:

- a sanding group 11 for a coarse pre-coating sanding;
- a sanding group 12 (here in the shape of a sanding wheel) for a finer sanding;
- four vacuum coating heads 13, 13', 13", 13''';
- two vacuum towers 14, 14';
- three gelling groups 15, 15', 15";
- two drying groups 16, 16';
- a belt sanding group 17;
- four sanding groups 18, 18', 18", 18''' for a coarse post-coating sanding;
- three sanding groups 19, 19', 19" for a finer post-coating sanding (sanding wheels);
- two corner sanding groups 20, 20', for sanding the head and the tail of panel 1, respectively;
- a sanding group 21 for the final sanding: this is a sanding group provided with a belt with a particularly fine grain.

[0041] Figure 3 shows an apparatus 430 according to the present invention, in top view. The bold arrow shows the conveying direction of the panel 1, whose edges are coated, one at a time.

[0042] The apparatus 430 according to the present invention comprises:

- a sanding group 11 for a coarse pre-coating sanding;
- a sanding group 12 (here in the shape of a sanding wheel) for a finer sanding;
- two vacuum coating heads 23, 23';
- one vacuum tower 14;
- two gelling groups 15, 15';
- a sanding group 22 placed immediately downstream the first gelling group 15, 15';
- two drying groups 16, 16';
- a belt sanding group 17;
- four sanding groups 18, 18', 18", 18''' for the coarse post-coating sanding;
- three sanding groups 19, 19', 19" for the finer post-coating sanding (sanding wheels);
- two corner sanding groups 20, 20', for sanding the head and the tail of panel 1, respectively;
- a sanding group 21 for the final sanding: this is a sanding group provided with a belt with a particularly fine grain.

[0043] At a glance, it can be observed that the apparatus 430 according to the present invention is shorter than the known art apparatus 410: indicatively, the ap-

paratus 410 is 22 metres long, while the apparatus 430 is 20 metres long.

[0044] In a way known in the art, the vacuum coating head is counter-shaped to the shape of the edge to be coated. In particular, both Figure 4 and Figure 5 show vacuum coating heads 13, 23 that can coat a panel 1' provided with a Jpull edge.

[0045] Figure 4 shows a plate vacuum coating head according to the known art in front view.

[0046] Said vacuum coating head 13 comprises:

- a pair of bores 40 for fixing said head to a support allowing to connect said head to the apparatus 410;
- a first suction nozzle 41 for suctioning a painting product;
- a dispensing nozzle 42 for dispensing said painting product;
- a second suction nozzle 43 for suctioning said painting product;
- a third suction nozzle 44 for suctioning said painting product;
- a nozzle 45 for providing compressed air;
- a fourth suction nozzle 46 for suctioning said painting product.

[0047] Figure 5A shows a vacuum head 23 according to the present invention in a front view, while Figure 5B shows the same vacuum head in an axonometric view. In the Figures, said vacuum coating head is shown as a plate coating head. Said plates are held together in a known way by a pair of side pins (not shown) inserted in a pair of bores 57 and two side screws (not shown) inserted in a pair of bores 58. The bold arrow shows the sliding direction of the panel 1 with respect to the vacuum head.

[0048] Here is worth noting that up to the introduction of 3D printing the vacuum coating heads used to be produced in the form of coating heads formed by a plurality of plates, as in this way obtaining cavities in solid pieces used to be easier. It is known obtaining said plates in metallic material, in a plastic material, or even in a wooden material (phenolic wood).

[0049] Nowadays, with 3D printing, pieces provided with internal cavities can be produced through additive manufacturing; therefore, the vacuum head 23 according to the present invention can be produced in a single solid piece, produced in plastic material, e.g. in epoxy resin, or in a metallic material, e.g. aluminium or stainless steel, provided with suitable characteristics.

[0050] Said vacuum coating head 23 comprises:

- a pair of bores 50 for fixing said head to a support allowing to connect said head to the apparatus 430;
- a dispensing nozzle 51 for dispensing a painting product;
- a first suction nozzle 52 for suctioning said painting product;
- an optional screed 53;

- a second dispensing nozzle 55 for dispensing said painting product;
- a second suction nozzle 56 for suctioning said painting product.

[0051] In the preferred embodiment, between the first suction nozzle 52 for suctioning a painting product and the second dispensing 55 for dispensing a painting product, there is provided said optional screed 53 protruding with respect to the profile of the vacuum coating head for a length ranging 0,1 to 0,5 mm. This minimal protrusion, difficult to be appreciated in the Figures, allows the screed 53 to perform two actions:

- pressing the applied painting product inside wood pores;
- pressing the wooden fibres raised by the suction generated by the first suction nozzle 52.

[0052] In the preferred embodiment, said screed 53 is shown between the first suction nozzle 52 and the second dispensing nozzle 55. Nonetheless, placing said screed 53 even downstream the second suction nozzle 56 is possible (not shown). The vacuum coating head 23 can also be provided with two screeds 53: one immediately downstream the first suction nozzle 52 and one immediately downstream the second suction nozzle 56 (not shown). Obviously, in order to obtain the dual function of the screed, the screed 53 must be placed downstream the suction nozzle 52 and/or 56. Nonetheless, if the function of pressing the painting product inside wood pores is considered sufficient, the screed 53 can even be placed immediately downstream the dispensing nozzles 51 and/or 55.

[0053] It is worth mentioning that inside a same vacuum coating head 23 according to the present invention, the quantity of painting product dispensed by the first dispensing nozzle 51 is the same as the quantity of painting product dispensed by the second dispensing nozzle 55. In the same way, the quantity of painting product suctioned by the first suction nozzle 52 is the same as the quantity of painting product suctioned by the second suction nozzle 56.

[0054] In an alternative embodiment, the quantity of painting product dispensed by the first and second dispensing nozzles 51, 55 of the first vacuum coating head 23 is preferably higher than the quantity of painting product dispensed by the first and second dispensing nozzles 51 and 55 of the second vacuum head 23'. Indicatively, if the first vacuum coating head 23 dispenses about 130 g/m² of painting product, the second vacuum coating head dispenses about 110 g/m² of painting product, so as to coat a panel 1 with about 240 g/m² of painting product overall. As said, among the advantages of the apparatus 430 there is the possibility of connecting two vacuum coating heads to just one vacuum tower 14. In an embodiment, the difference in the quantity of dispensed painting product is obtained by inserting partialization

means (not shown, e.g. taps) on the respective lines (not shown) connecting the vacuum tower 14 to each vacuum coating head 23, 23'. Said partialization means are then adjusted in order to differentiate the quantity of painting product dispensed by vacuum coating heads 23, 23' connected to the same vacuum tower 14.

[0055] It is worth noting that the vacuum coating head 23, provided with two dispensing nozzles 51, 55 in fact applies two layers of painting product with respect to the vacuum known art coating head 13, which is provided with just one dispensing nozzle 42. The application of painting product by the second dispensing nozzle 55 on the first layer of painting product dispensed by the first dispensing nozzle 51 is a wet-on-wet application, as the gelling group 15 is placed downstream each vacuum coating head 23.

[0056] The skilled man has the entrenched prejudice that by gelling the applied layer before applying the second layer of painting product a better result will be obtained, due to a better adhesion of the successive layer of painting product on a dried or at least gelled layer. Surprisingly, it was observed that the presence of the screed compensates for the lack of gelation, while the screed presses the wood fibres raised by the first suction nozzle 52. This overall allows to provide a higher quantity of painting product on the panel 1 with respect to the usual coating method (application of painting product - gelation - successive application of painting product).

1	panel	
2	undercut edge	
3	Jpull edge	
4	radius edge	
11	coarse sanding group	
12	sanding group	
13	vacuum coating head	
14	vacuum tower	
15	gelling group	
16	drying group	
17	band sanding group	
18	coarse sanding group	
19	fine sanding group	
20	corner sanding group	
21	final sanding group	
22	sanding group	
23	vacuum coating head	
40	bore	
41	first suction nozzle	
42	dispensing nozzle	
43	second suction nozzle	
44	third suction nozzle	
45	compressed air nozzle	
46	fourth suction nozzle	
50	bore	
51	first dispensing nozzle	
52	first suction nozzle	
53	screed	
55	second dispensing nozzle	

56	second suction nozzle	
57	bore	
58	bore	
410	known art apparatus	
5	430	apparatus according to the present invention

Claims

- | | | |
|----|----|--|
| 10 | 1. | Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1), said vacuum coating head being supplied by a vacuum tower (14) which provides to supplying and suctioning said painting product, said vacuum coating head (23) being characterized in that it comprises at least: |
| 15 | | - a first dispensing nozzle (51) for dispensing said painting product; |
| | | - a first suction nozzle (52) for suctioning said painting product; |
| 20 | | - a second dispensing nozzle (55) for dispensing said painting product; |
| | | - a second suction nozzle (56) for suctioning said painting product; |
| 25 | | - at least a screed (53) protruding with respect to the vacuum coating-head profile. |
| 30 | 2. | Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1) according to claim 1, comprising in that order: |
| | | - a first dispensing nozzle (51) for dispensing said painting product; |
| | | - a first suction nozzle (52) for suctioning said painting product; |
| 35 | | - a screed (53) protruding with respect to the vacuum coating head profile, said screed (53) being placed between said first suction nozzle (52) and said second dispensing nozzle (55) for a painting product; |
| 40 | | - a second dispensing nozzle (55) for dispensing said painting product; |
| | | - a second suction nozzle (56) for suctioning said painting product. |
| 45 | 3. | Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1) according to claim 1, comprising at least a screed (53) protruding with respect to the vacuum coating head profile, said screed (53) being placed alternatively: |
| 50 | | - immediately downstream said second suction nozzle (56), or |
| | | - immediately downstream said first dispensing nozzle (51), or |
| 55 | | - immediately downstream said second dispensing nozzle (55); |

in case the vacuum coating head (23) is provided with two screeds (53), they are placed alternatively:

- immediately downstream the first and second suction nozzle (52, 56), or
- immediately downstream the first and the second dispensing nozzle (51, 55).

4. Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1) according to one or more of claims 1-3, realized in the form of a plurality of plates made of metal, plastic or wooden material, or alternatively in the form of a monolithic body obtained through 3D printing, in a suitable plastic or metallic material. 10
5. Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1) according to one or more of claims 1-4, supplied by a vacuum tower (14), configured so that the quantity of painting product provided by the first dispensing nozzle (51) is the same as the quantity of painting product dispensed by the second dispensing nozzle (55). 15
6. Vacuum coating head (23) for applying a painting product to an edge of wooden panels (1) according to one or more of claims 1-4, supplied by a vacuum tower (14), wherein connecting tubes between said vacuum tower (14) and vacuum coating heads (23, 23') are provided with adjustable partialization means allowing to adjust the quantity of painting product dispensed by said vacuum coating heads (23, 23') connected to a same vacuum tower (14), so that the quantity of painting product supplied by the first vacuum head (23) is different from the quantity of painting product supplied by the second vacuum head (23'). 25
30
35
7. Method for applying a painting product to an edge of wooden panels (1) performed through a vacuum coating head (23) according to claims 1-6, **characterized in that** each vacuum head (23) applies at least two wet-on-wet layers of painting product through said first dispensing nozzle (51) and second dispensing nozzle (55). 40
45
8. Method for applying a painting product to an edge of wooden panels (1) performed through a vacuum coating head (23) according to claim 7, wherein said screed (53) provides to: 50
 - pressing said painting product inside the edge pores;
 - pressing wood fibres raised by suction nozzle. 55
9. Method for applying a painting product to an edge of wooden panels (1) performed through a vacuum coating head (23) according to claim 7 or 8, wherein

one vacuum tower (14) supplies one, two or even three vacuum coating heads (23).

10. Method for applying a painting product to an edge of wooden panels (1) performed through a vacuum coating head (23) according to one or more of claims 7-9, wherein the thickness of the layer of said painting product applied on an edge of panels (1) is adjusted by acting on:
 - the viscosity of the liquid painting product,
 - the flow rate of the painting product supplied through said dispensing nozzles (51, 55) and/or partialization means applied to the tubes connecting said vacuum coating head (23) and vacuum tower (14),
 - the conveying speed of said panel (1) inside an apparatus (430) comprising at least one said vacuum coating head (23),
 - the degree of vacuum generated by said suction nozzles (52, 56).

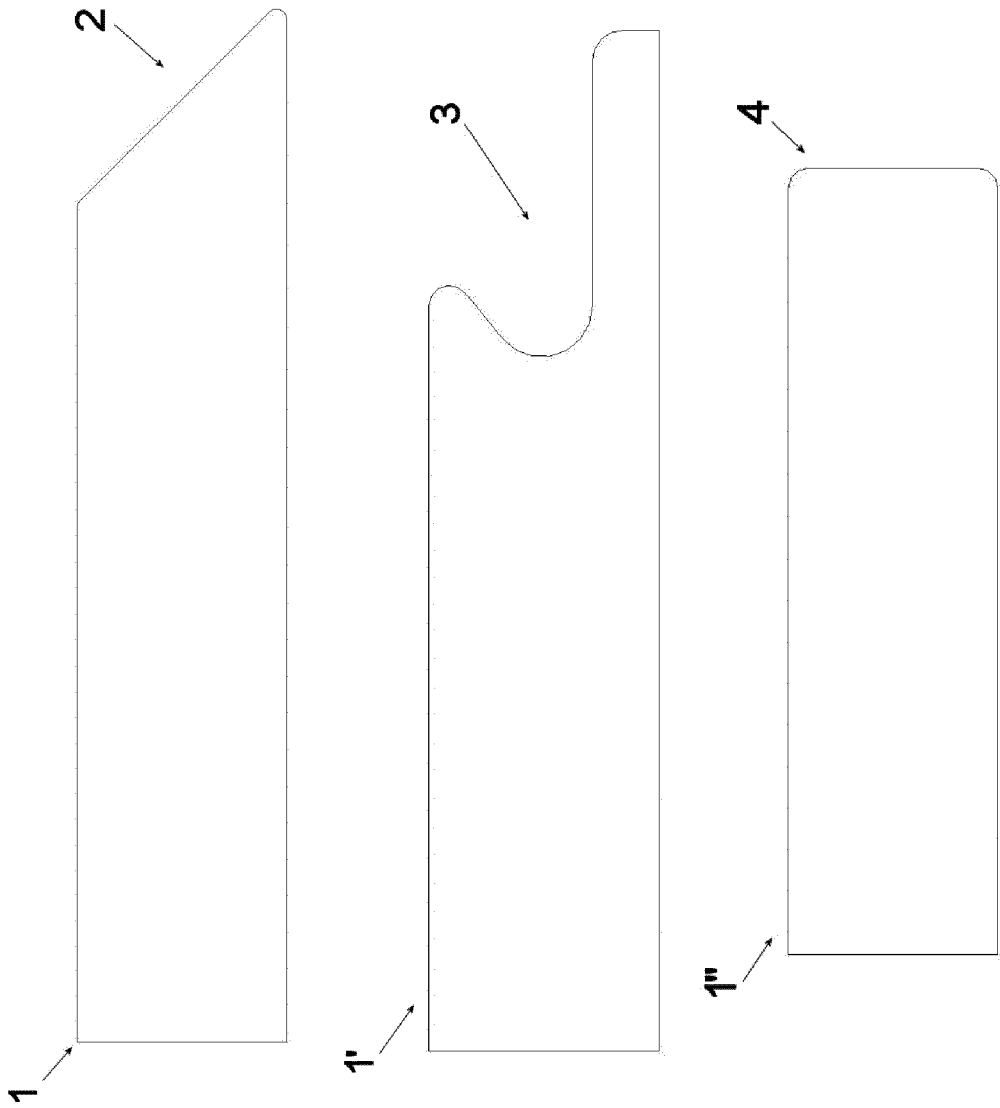


FIG. 1

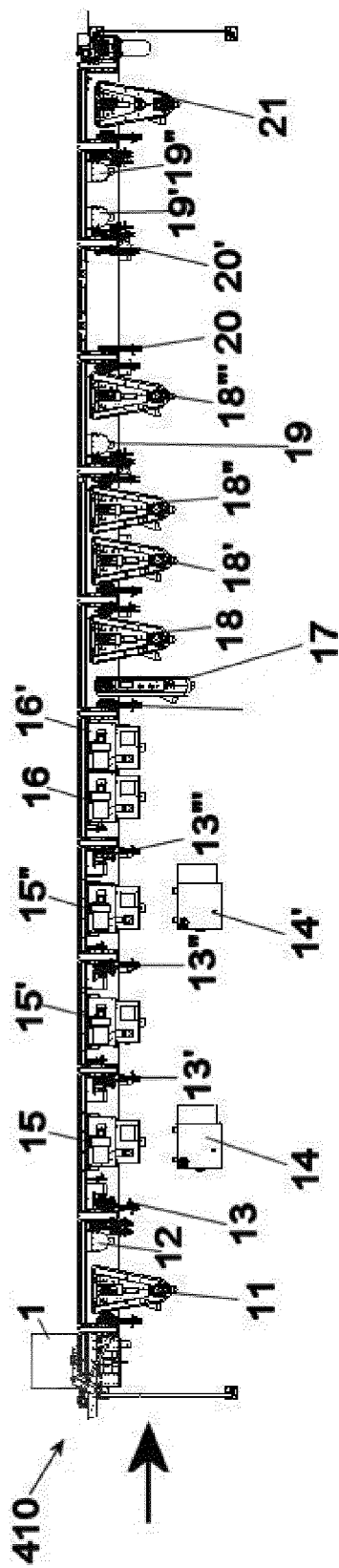


FIG. 2

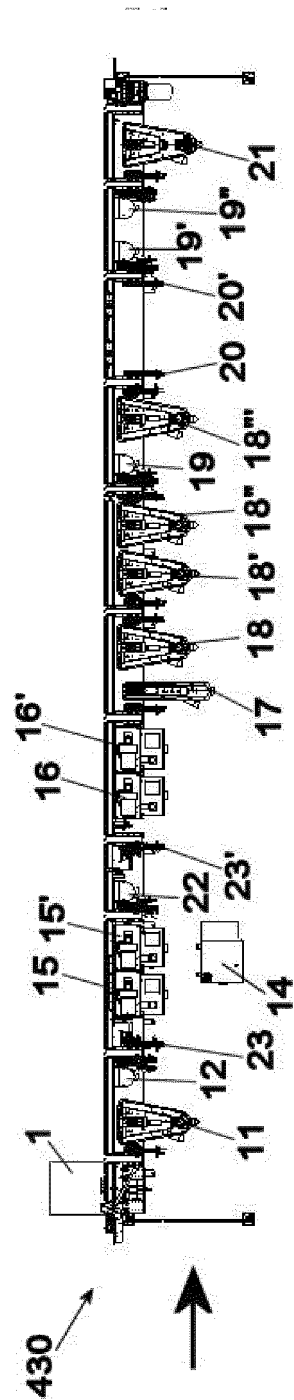


FIG. 3

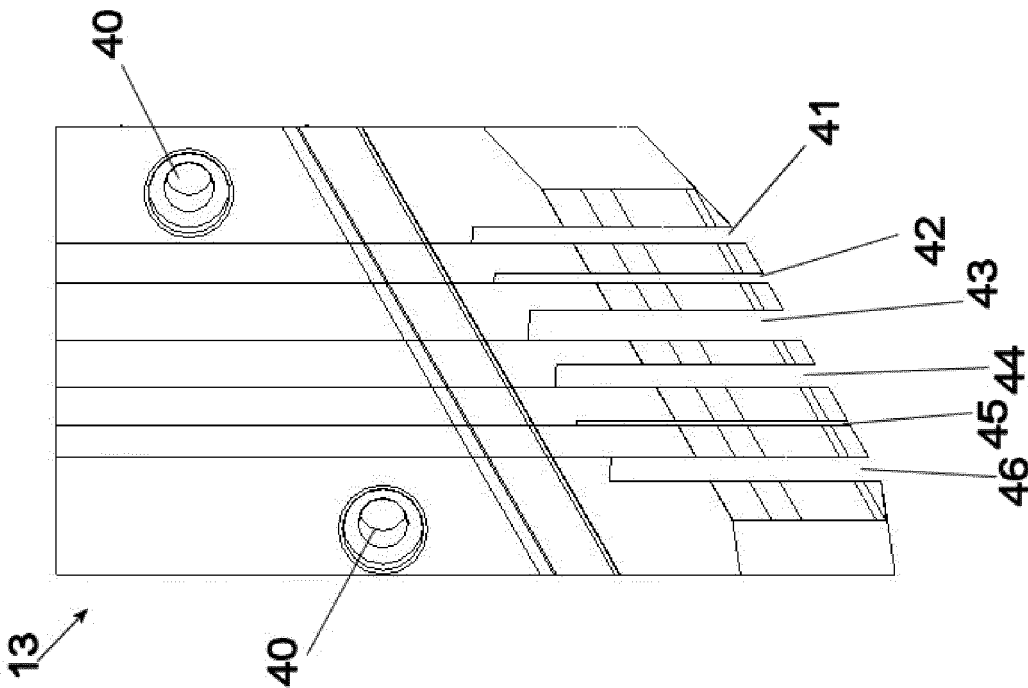


FIG. 4

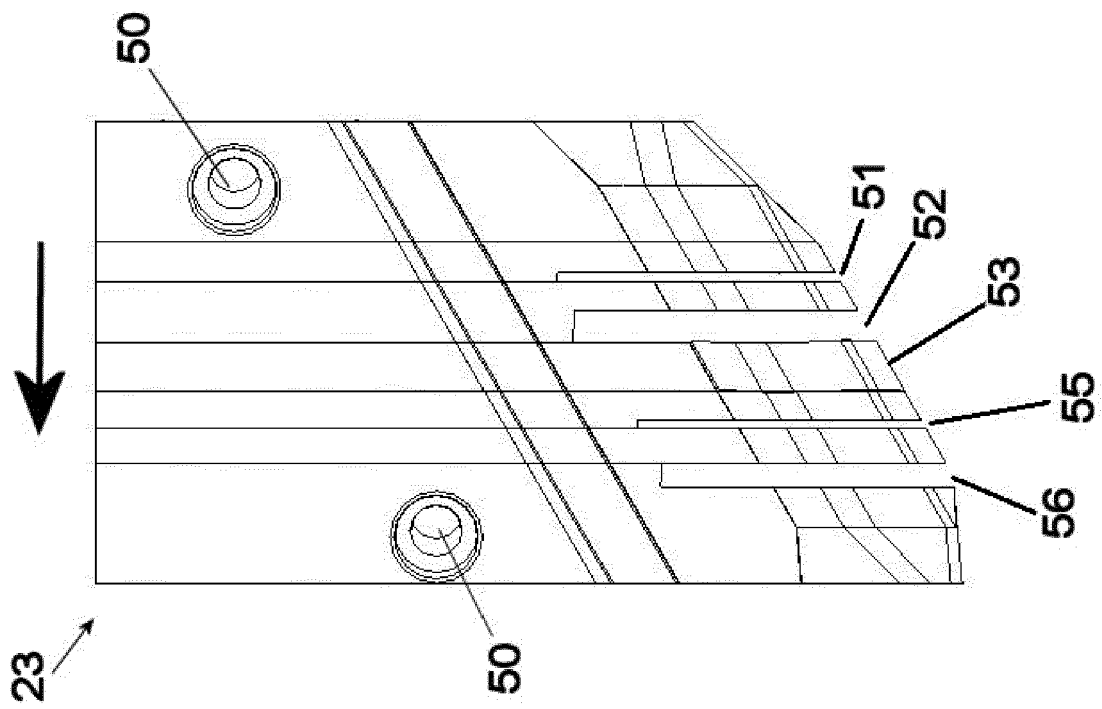


FIG. 5A

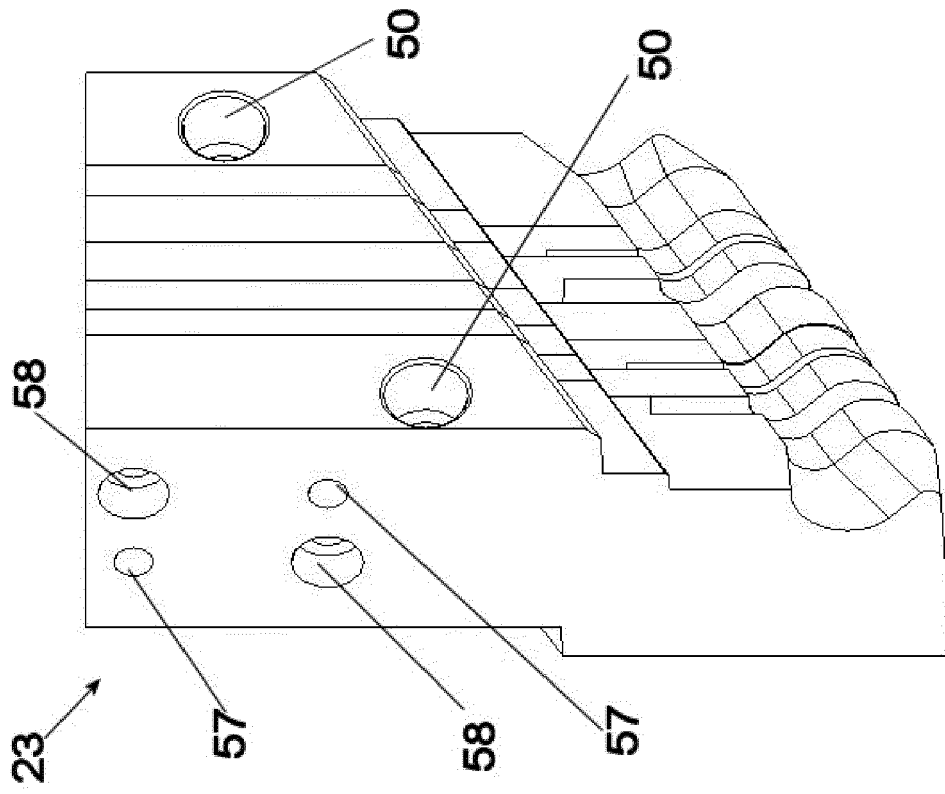


FIG. 5B



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 2909

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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