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(54) **ASSEMBLY FOR APPLYING AN ANTI-ADHESIVE LIQUID ON THE EDGE OF A PANEL AND MACHINE INCLUDING SUCH ASSEMBLY**

(57) The present invention relates to an assembly (1) for applying an anti-adhesive liquid to a workpiece, preferably a panel (P) intended to the application of an edge, wherein said assembly (1) is movable, in use, with respect to said panel (P), and wherein said assembly (1) comprises a fixing interface (10) for coupling with an electrospindle (224) along a reference axis (A), and at least one applying member (131, 132) for applying said an-

ti-adhesive liquid on at least a portion of a face (P₁, P₂) of said panel (P), characterized in that it comprises at least one dispenser (11, 12) of said anti-adhesive liquid for dispensing said anti-adhesive liquid on said at least one applying member (131, 132).

The present invention also relates to a machine (2) for working panels (P).

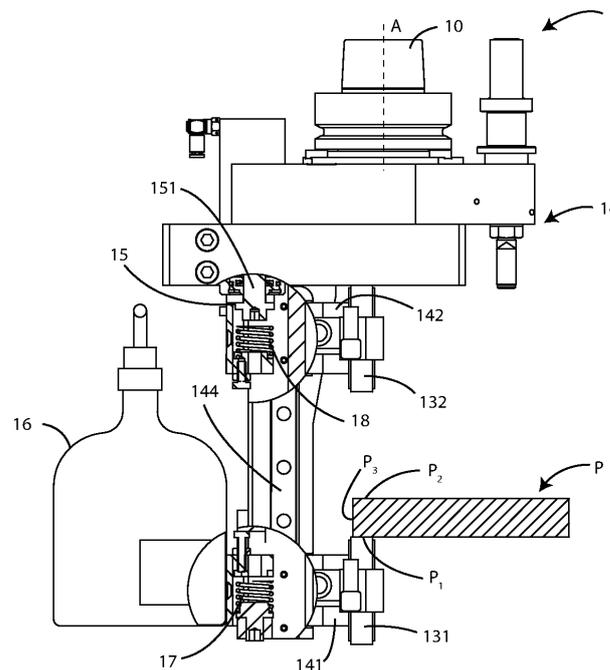


Fig. 6

Description

[0001] The present invention relates to an assembly for applying an anti-adhesive liquid on the edge of a panel and machine including such assembly.

[0002] More specifically, the invention relates to an assembly for the application of anti-adhesive liquid, made in particular in a machining center equipped with a banding unit.

[0003] In the following the description will be addressed to an assembly for the application of anti-adhesive liquid used on woodworking machining centers equipped with a banding unit, but it is clear that the same should not be considered limited to this specific use.

[0004] As is well known in the wood panel-machining sector, these panels, after being cut, require the application, by gluing, of a finishing edge on the side face on which the cutting took place.

[0005] During the application of the glue on said side face of the panel, for example by means of a roller, it may happen that part of the excess glue goes on the two upper and lower faces of the panel, adjacent to the side face to be edged.

[0006] This excess glue is subsequently removed due to a specific glue-scraping unit. However, the operation of removing the glue from the two upper and lower faces of the panel can be difficult, in addition to ruining the panel.

[0007] To ease this operation, before applying the glue, an anti-adhesive liquid is dispensed on said two upper and lower faces near the face to be edged, which prevents the adhesion of the excess glue.

[0008] In machining centers, the panel, constrained on a work surface, is subjected to various processes thanks to the movement of a machining head, arranged on a crosspiece, which can support, one at a time, the different tools or assemblies, depending on the machining or operation to be carried out on the piece. Said tools or assemblies when not in use, are arranged in a magazine.

[0009] For the application of the anti-adhesive liquid, an assembly is used which has two nozzles arranged respectively facing the upper and lower face of the panel adjacent the face to be edged, so as to deliver anti-adhesive liquid by spraying on them.

[0010] The distance between these two nozzles, in general, must be manually adjusted by an operator according to the panel thickness.

[0011] It is clear that this manual procedure, to be carried out every time the thickness of a panel to be machined changes, has a negative impact on processing times, as well as being expensive in terms of commitment of an operator.

[0012] A further technical problem of the aforementioned assembly is that during the nebulization of the anti-adhesive liquid on the two upper and lower faces of the panel adjacent the face to be edged, said liquid can also be accidentally atomized on said face to be edged, thus not allowing perfect adhesion of the glue and therefore

of the edge to be applied.

[0013] To overcome this problem, it is known to use air blowers to divert the flow of the anti-adhesive liquid only on the desired panel face. However, this solution is not very reliable and does not completely avoid the presence of anti-adhesive liquid on the side face to be edged. In fact, often, before applying the glue, it is necessary to grind the face itself using a milling tool. This implies an additional tool change, which will adversely affect the machining times.

[0014] In the relevant prior art flow banding machines are also comprised, in which, in this case, the panel is worked by the different groups, while it is moved by means of conveyor systems, such as for example belts or roller conveyors.

[0015] In such machines, the working sequence is as follows:

- application of anti-adhesive liquid by spray nozzles or by roller;
- adjustment of the face on which the border will be applied;
- glue application;
- application of the edge;
- sizing of the edge.

[0016] In case of the anti-adhesive liquid is delivered to the panel by means of nebulizing nozzles, the technical problem of the accidental delivery on the face to be edged represents a less significant problem than the case discussed above of the machining center, since, during the passage of the panel, grinding is carried out without appreciable additional processing times.

[0017] In the case of the application of anti-adhesive liquid through rollers, on the other hand, the anti-adhesive liquid is applied on the panel by means of two rollers, each one of which applies the anti-adhesive by contact on the upper or lower surface, near the side surface to be banded.

[0018] Said two rollers are wet by the anti-adhesive liquid, for example by nebulization, through two respective nozzles, and the contact of said rollers with the panel is guaranteed by the action of springs.

[0019] The distance between said two rollers must be manually adjusted by an operator according to the thickness of the panel. This manual adjustment procedure, to be carried out whenever the thickness of a panel to be worked varies, negatively affects the machining times.

[0020] In the light of the above, it is therefore an object of the present invention to propose an assembly for applying anti-adhesive liquid that can be used on a machining center with a banding unit, which allows automatic adjustment of the means for dispensing said liquid according to the thickness of the panel.

[0021] Another object of the invention is to avoid the accidental delivery of anti-adhesive liquid on the face of the panel, on which the glue and subsequently the band have to be applied.

[0022] A further object of the present invention is to provide the tools necessary for the execution of the method and the apparatuses, which perform this method.

[0023] It is therefore specific object of the present invention an assembly for applying an anti-adhesive liquid to a workpiece, preferably a panel intended to the application of an edge, wherein said assembly is movable, in use, with respect to said panel, and wherein said assembly comprises a fixing interface for coupling with an electrospindle along a reference axis, and at least one applying member for applying said anti-adhesive liquid on at least a portion of a face of said panel, characterized in that it comprises at least one dispenser of said anti-adhesive liquid for dispensing said anti-adhesive liquid on said at least one applying member.

[0024] Always according to the invention, said assembly may comprise a first and a second applying member and a first and a second dispenser respectively.

[0025] Still according to the invention, said at least one applying member may be of contact type.

[0026] Further according to the invention, said at least one applying member may be a roller.

[0027] Preferably according to the invention, said at least one dispenser may comprise at least a nozzle, for nebulizing said anti-adhesive liquid on the respective applying member.

[0028] Advantageously according to the invention, said assembly may comprise a frame, a lower support element, to support said first applying member and said first dispenser, an upper support element, to support said second applying member and said second dispenser, and a guide coupled with said frame and arranged in parallel with respect to a direction, preferably parallel to said reference axis, wherein said lower support element and/or said upper support element are slidingly coupled with said guide.

[0029] Always according to the invention, said assembly may comprise an electric and/or hydraulic and/or pneumatic actuator, configured to move said first and second applying member on said guide relatively to each other.

[0030] Still according to the invention, said actuator may be of pneumatic type and comprises a stem and a cylinder.

[0031] Advantageously according to the invention, said assembly may comprise a first spring interposed between said lower support element and said first applying member and/or a second spring interposed between said upper support element and said second applying member.

[0032] Preferably according to the invention, said assembly may comprise said first spring placed between said stem and said lower support element and/or it comprises said second spring interposed between said stem and said upper support element.

[0033] Further according to the invention, said at least one dispenser may comprise at least a tank installed on said frame containing said anti-adhesive liquid, wherein

said tank is configured to refill said at least one dispenser and/or at least one applying member.

[0034] Always according to the invention, said at least one applying member may be at least partially immersed in said tank, so that said at least one applying member is wet with said liquid.

[0035] Still according to the invention, said assembly may comprise a duct for supplying said at least one dispenser of said anti-adhesive liquid, wherein said duct is connectable to a remote tank.

[0036] Advantageously according to the invention, said assembly may comprise a sensor for monitoring the amount of anti-adhesive liquid contained in said tank or in said remote tank.

[0037] It is further object of the present invention a machine for working panels, comprising a base, having a working plane for supporting and clamping said panels, a banding unit for banding said panels, movable along a first, a second, and a third Cartesian axis, and an operating head, movable along said first, second, and third Cartesian axis, said operating head comprises an electrospindle, wherein said machine is characterized in that it further comprises an assembly for applying an anti-adhesive liquid according to any one of the preceding claims, wherein said assembly is removably coupled with said electrospindle of said operating head, and wherein said assembly is configured for applying an anti-adhesive liquid on portions of the surface of said panel, before banding said panel by means of said banding unit.

[0038] 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 a perspective view of a machine equipped with the assembly for dispensing anti-adhesive liquid according to the invention;

figure 2 shows a detailed perspective view of the anti-adhesive liquid dispensing assembly according to the invention installed on a machine;

figure 3 shows a perspective view of the assembly for dispensing anti-adhesive liquid according to the invention;

figure 4 shows a further perspective view of the dispensing assembly of anti-adhesive liquid according to the invention;

figure 5 shows a side view of the anti-adhesive liquid dispensing assembly according to the invention;

figure 6 shows a front view, with a partial section of the anti-adhesive liquid dispensing assembly according to the invention with a panel.

[0039] In the various figures, similar parts will be indicated by the same reference numbers.

[0040] Said assembly 1 is used on a machine 2 or machining center, in particular a machining center as shown in figures 1-2.

[0041] Referring to figure 1, said machine 2 for ma-

chining pieces, such as for example panels P, comprises a base 20 comprising in its turn a working plane 21 for supporting said panels P to be processed, and a blocking system 23 to support and block the panel P to be machined on said working plane 21.

[0042] Said machine 2 further comprises a processing unit 22, movable with respect to said working plane 21 and said base 20. Said processing unit 22 translates along said working plane 21 along a Cartesian axis X.

[0043] Said processing unit 22 comprises a crossbar 221, which extends in length along a Y-axis orthogonal to said X-axis.

[0044] Said processing unit 22 further comprises an operating head 222, slidably coupled to said crossbar 221 along said Y-axis by means of guiding means 225.

[0045] Said operating head 222 comprises in turn an electrospindle 224.

[0046] Said electrospindle 224 can be oriented in the space by said operating head 222 and is equipped with a socket for locking the different types of machining tools and other devices, including also the assembly 1 for the application of the anti-adhesive liquid described below. Said mobile processing unit 22 further comprises a banding unit 223, also slidably coupled with said crossbar 221 along said Y-axis, independently of said operating head 222 and by means of said guiding means 225.

[0047] Referring to figures 3-6, an assembly 1 is observed for the application of anti-adhesive liquid according to the present invention, usable on machining centers equipped with a banding unit.

[0048] Said assembly 1 for the application of anti-adhesive liquid essentially comprises a fixing interface 10, for coupling with said electrospindle unit 224 along a reference axis A, at least one applying member 131, 132, and at least one dispenser means 11, 12.

[0049] In the embodiment shown, said assembly 1 comprises a first 131 and a second 132 contact applicator member, in particular a first and a second roller, and a first 11 and a second 12 spraying dispenser means, in particular a first 121 and a second nozzle 122 for spraying the anti-adhesive liquid on said rollers 131 and 132.

[0050] In another embodiment, not shown in the figures, said first 131 and second 132 rollers are partially immersed in a respective tank containing said anti-adhesive liquid, so as to allow the transfer of the anti-adhesive liquid from each of said tanks to said first 131 and second 132 roller.

[0051] Said assembly 1 comprises a frame 14, which in turn comprises a lower support element 141 and an upper support element 142 to support said first 131 and second 132 roller and said first 121 and second 122 nozzle, respectively. Said frame 14 also comprises an abutment element 144, arranged parallel to said reference axis a, and a guide 143 arranged parallel to said reference axis A.

[0052] Said upper support element 142 is slidably coupled to said guide 143, so as to allow the movement of said second roller 132.

[0053] In a further embodiment (not shown in the figures) said lower support element 141 can be slidably coupled to said guide 143. Still according to a further embodiment, both said support elements 141, 142 can be slidably coupled to said guide 143.

[0054] Furthermore said assembly 1 comprises an actuator 15, of pneumatic, electric or hydraulic type, for moving, along a direction parallel to said reference axis A, said first 131 and/or said second 132 roller, so as to adapt its position when they are in contact with the panel P to be banded, according to the thickness of the latter.

[0055] Said actuator 15, which in the embodiment shown is of the pneumatic type, comprises a cylinder (not visible in the figures) and a stem 151.

[0056] Said pneumatic actuator 15 is configured to allow said second roller 132 to move along said direction parallel to said reference axis A.

[0057] More precisely, said pneumatic actuator 15 causes the movement of said upper support element 142 along said guide 143.

[0058] Said assembly 1 further comprises a first spring 17, associated with the first roller 131 and arranged on said lower support element 141, and adapted, by working in compression, to guarantee the contact between said first roller 131 and the lower face P1 of said panel P, on which applying the anti-adhesive liquid.

[0059] However, due to the internal friction between said cylinder and said rod 151, said pneumatic actuator may not always guarantee optimal contact between said second roller 132, and the upper face P2 of said panel P in case of variations in thickness of the same panel P.

[0060] To compensate for any changes in thickness of said panel P, said stem 151 comprises a second spring 18 associated with it and arranged on said upper support element 142.

[0061] Said assembly 1 is also equipped with a tank 16 of anti-adhesive liquid, preferably installed on said support frame 14 of said assembly 1, to supply said dispensing means 11, 12 with anti-adhesive liquid.

[0062] In another embodiment, said tank 16 is remote with respect to said assembly 1 and feeds said dispensing means 11, 12 through a conduit (not shown in the figures).

[0063] Said tank 16 can comprise a sensor for monitoring the quantity of anti-adhesive liquid in the same.

[0064] The operation of the assembly 1 for dispensing the anti-adhesive liquid described above is as follows.

[0065] An operator loads a panel P to be worked on the working plane 21 of said machine 2, locking it to the same by means of the blocking system 23.

[0066] Once the panel P is blocked, the processing unit 22 translates along said working plane 21, in the direction of the X-axis, until the crossbar 221 is above said panel P. The operating head 222 thus positions itself close to said panel P along the direction of the Y-axis, thanks to the movement along the guiding means 225.

[0067] Said panel P is then subjected to the various cutting and/or milling processes by means of a process-

ing tool supported and operated by the electrospindle 224, arranged on the operating head 222, and oriented in the space thanks to the movements of said head 222.

[0068] For example, once the cutting operations are ended, said panel P, before being banded with the banding unit 223 on the side P3, where the cutting took place, is subjected to the application of anti-adhesive liquid on the two faces, upper P2 and lower P1, adjacent to the lateral face P3 to be banded.

[0069] The head 222 stores the machining tool previously used for cutting in the specific magazine and from it takes the assembly 1, which is equipped with an interface 10 for coupling with the electrospindle 224.

[0070] At this point, with the methods described above for the cutting operations on the panel P, the head is repositioned close the panel P bringing the assembly 1 laterally close to the face P3 of the panel P to be banded, thanks to the abutment element 144.

[0071] Subsequently, the spring 17 is loaded and said first roller 131 is brought into contact with the lower face P1 of the panel P.

[0072] The pneumatic actuator 15 is then activated, which moves the upper support element 142, and consequently the second roller 132, in a direction parallel to said reference axis A, along the guide 143, until said second roller 132 comes into contact with the upper face P2 of the panel P.

[0073] At this point, the spring 18, working in compression, guarantees an optimal contact between said second roller 132 and the upper face P2 of the panel P.

[0074] Subsequently the first 121 and the second 122 nozzle nebulize the anti-adhesive liquid taken from the tank 16 on the first 131 and second 132 roller respectively.

[0075] Finally, thanks to the movement of the operating head 222 and/or the processing unit 22, the assembly 1 translates along the direction where the band must be applied, so that said first 131 and second 132 rollers, rolling respectively on said lower and top face of the panel P, apply the anti-adhesive liquid.

[0076] Once the operations for the application of liquid anti-adhesive are completed, the panel P is subjected to the banding machining by means of said banding unit 223.

[0077] An advantage of the present invention is that of reducing the working times and the workload on the operator, allowing an automatic adjustment of the means for dispensing said liquid according to the thickness of the panel.

[0078] Another advantage of the invention is that of avoiding the accidental detachment of the band due to the accidental delivery of anti-adhesive liquid on the lateral face P3 of the panel, on which the glue and subsequently the band have to be applied.

[0079] A further advantage of the present invention is that of avoiding a milling process on the band of the panel to be banded, subsequent to the application of anti-adhesive liquid, thus positively influencing the processing

times.

[0080] 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.

10 Claims

1. Assembly (1) for applying an anti-adhesive liquid to a workpiece, preferably a panel (P) intended to the application of an edge, wherein said assembly (1) is movable, in use, with respect to said panel (P), and wherein said assembly (1) comprises a fixing interface (10) for coupling with an electrospindle (224) along a reference axis (A), and at least one applying member (131, 132) for applying said anti-adhesive liquid on at least a portion of a face (P1, P2) of said panel (P), **characterized in that** it comprises at least one dispenser (11, 12) of said anti-adhesive liquid for dispensing said anti-adhesive liquid on said at least one applying member (131, 132).
2. Assembly (1) according to the preceding claim, **characterized in that** it comprises a first (131) and a second (132) applying member and a first (11) and a second (12) dispenser respectively.
3. Assembly (1) according to the preceding claim, **characterized in that** said at least one applying member (131, 132) is of contact type.
4. Assembly (1) according to the preceding claim, **characterized in that** said at least one applying member (131, 132) is a roller.
5. Assembly (1) according to any one of the preceding claims, **characterized in that** said at least one dispenser (11, 12) comprises at least a nozzle (121, 122), for nebulizing said anti-adhesive liquid on the respective applying member (131, 132).
6. Assembly (1) according to any one of claims 2-5, **characterized in that** it comprises a frame (14), a lower support element (141), to support said first applying member (131) and said first dispenser (11), an upper support element (142), to support said second applying member (132) and said second dispenser (12), and a guide (143) coupled with said frame (14) and arranged in parallel with respect to a direction, preferably parallel to said reference axis (A), wherein said lower support element (141) and/or said upper sup-

- port element (142) are slidingly coupled with said guide (143).
7. Assembly (1) according to the preceding claim, **characterized in that** it comprises an electric and/or hydraulic and/or pneumatic actuator (15), configured to move said first (131) and second (132) applying member on said guide (143) relatively to each other. 5
 8. Assembly (1) according to the preceding claim, **characterized in that** said actuator (15) is of pneumatic type and comprises a stem (151) and a cylinder. 10
 9. Assembly (1) according to any one of claims 6-8, **characterized in that** it comprises a first spring (17) interposed between said lower support element (141) and said first applying member (131) and/or a second spring (18) interposed between said upper support element (142) and said second applying member (132). 15
 10. Assembly (1) according to claim 8, **characterized in that** it comprises said first spring (17) placed between said stem (151) and said lower support element (141) and/or it comprises said second spring (18) interposed between said stem (151) and said upper support element (142). 20
 11. Assembly (1) according to any one of claims 6-10, **characterized in that** said at least one dispenser (11, 12) comprises at least a tank installed on said frame (14) containing said anti-adhesive liquid, wherein said tank is configured to refill said at least one dispenser (11, 12) and/or at least one applying member (131, 132). 25
 12. Assembly (1) according to the preceding claim, **characterized in that** said at least one applying member (131, 132) is at least partially immersed in said tank, so that said at least one applying member (131, 132) is wet with said liquid. 30
 13. Assembly (1) according to any one of claims 1-10, **characterized in that** it comprises a duct for supplying said at least one dispenser (11, 12) of said anti-adhesive liquid, wherein said duct is connectable to a remote tank. 35
 14. Assembly (1) according to any one of claims 11-13, **characterized in that** it comprises a sensor for monitoring the amount of anti-adhesive liquid contained in said tank (16) or in said remote tank. 40
 15. Machine (2) for working panels (P), comprising a base (20), having 45
- a working plane (21) for supporting and clamp-
- ing said panels (P),
a banding unit (223) for banding said panels (P),
movable along a first (X), a second (Y) and a
third (Z) Cartesian axis, and
an operating head (222), movable along said
first (X), second (Y) and third (Z) Cartesian axis,
said operating head (222) comprises an electro-
spindle (224),
- wherein said machine (2) is **characterized in that**
it further comprises an assembly (1) for applying an
anti-adhesive liquid according to any one of the pre-
ceding claims,
wherein said assembly (1) is removably coupled with
said electrospindle (224) of said operating head
(222) and
wherein said assembly (1) is configured for applying
an anti-adhesive liquid on portions of the surface of
said panel (P), before banding said panel by means
of said banding unit (223).

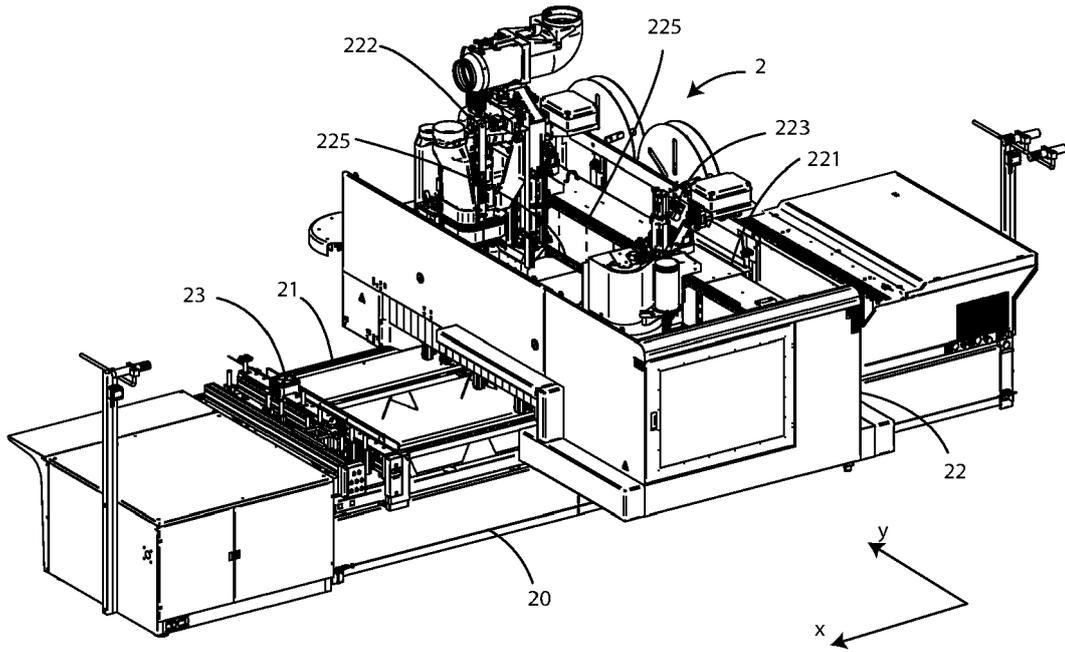


Fig. 1

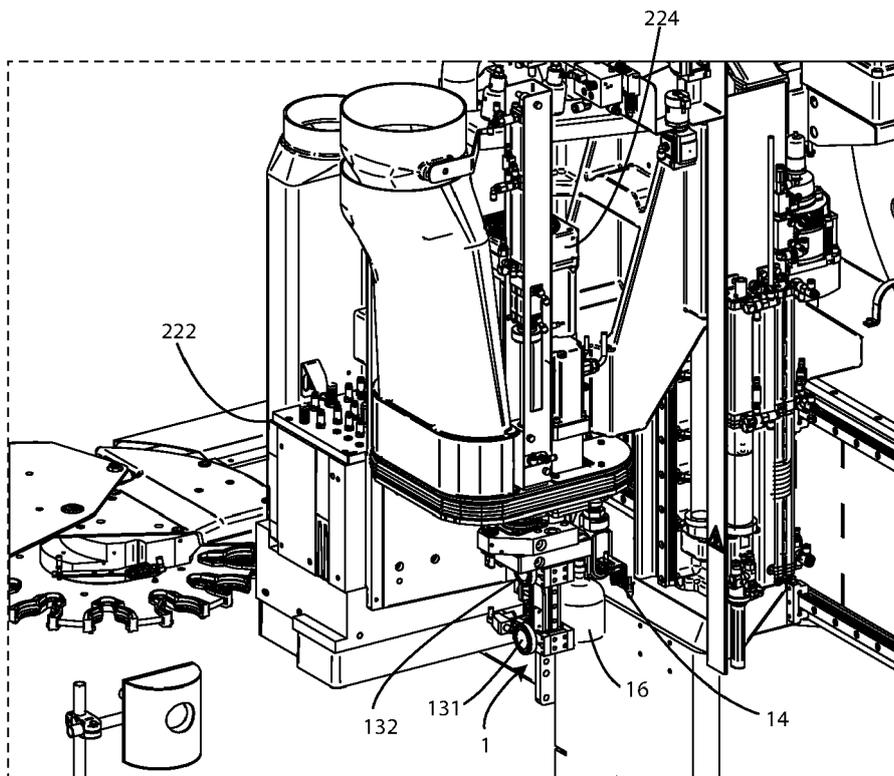


Fig. 2

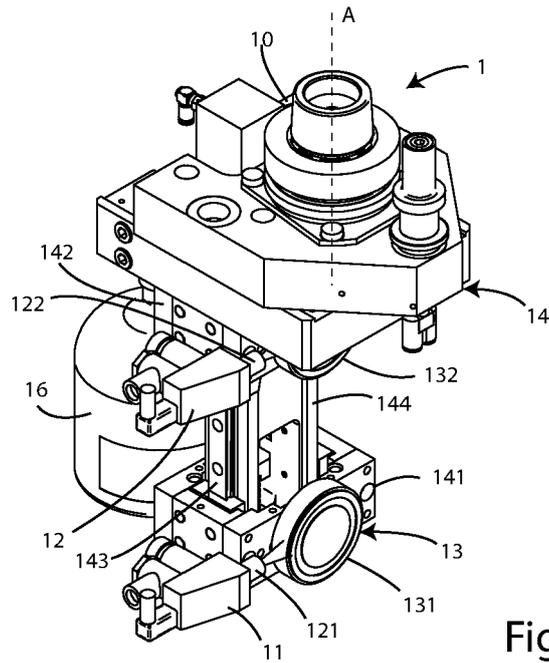


Fig. 3

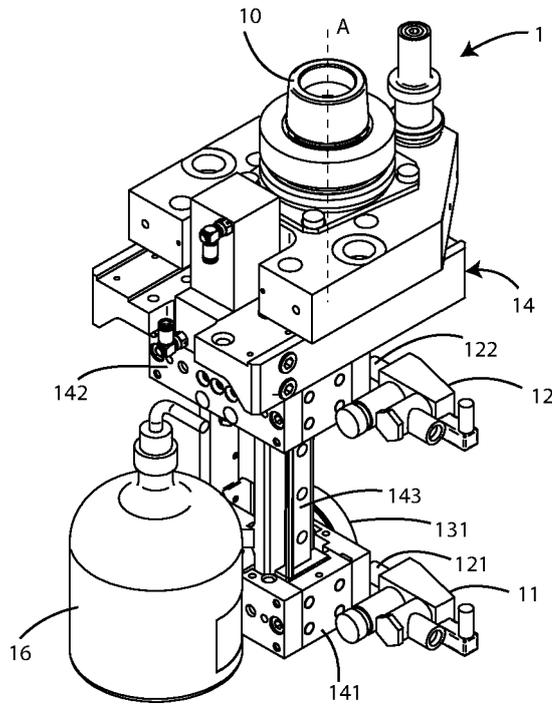


Fig. 4

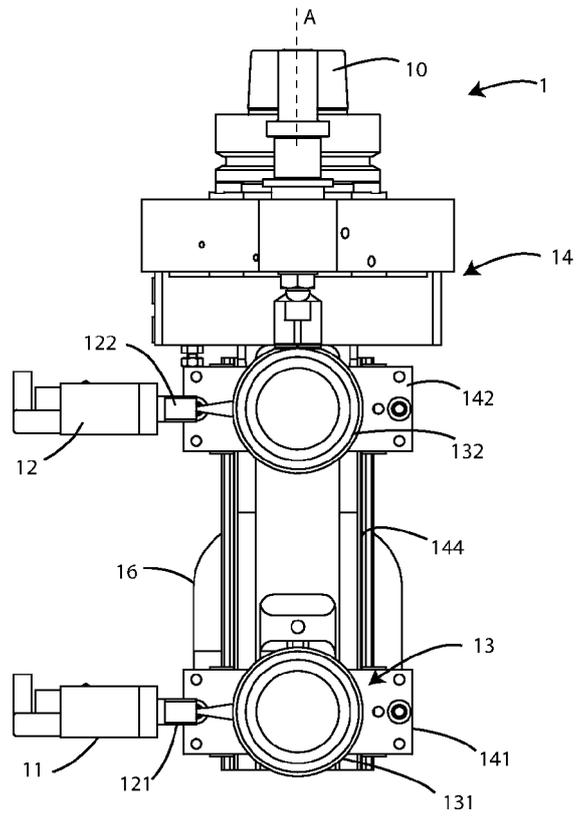


Fig. 5

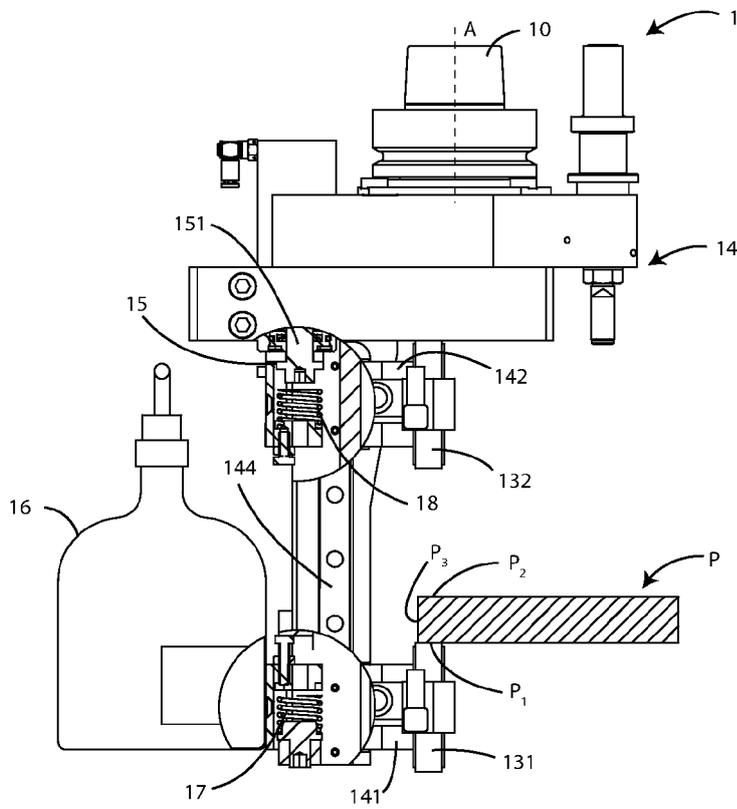


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 20 16 6689

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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X A	EP 2 774 734 A1 (DÖLLKEN & CO GMBH W [DE]) 10 September 2014 (2014-09-10) * abstract * * paragraph [0030] * * claims 4, 6 * * figures * -----	1-9, 11-15 10	INV. B27D5/00
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 September 2020	Examiner Hamel, Pascal
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 16 6689

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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08-09-2020

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