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(54) A GLUE APPLICATION UNIT FOR A LABELING APPARATUS

(57) There is described a glue application unit (1) for a labeling apparatus (2) comprising a glue roller (5) having an outer lateral surface (6); a glue feeding device (7) for feeding melted glue to the glue roller (5); and a glue distribution bar assembly (8) arranged having a glue feeding channel (22) and an outlet section (24) adapted to selectively transfer the glue from the glue feeding channel (22) to the glue roller (5). The glue distribution bar assembly (8) comprises a glue distribution bar (25), carrying the outlet section (24) and comprising a fixing block (40) spaced apart from glue roller 5; a moveable glue distribution group (41) carrying the outlet section (24); alignment means (42) adapted to align the glue distribution group (41) with respect to the outer lateral surface (6); and a glue feeding portion (43) adapted to establish a fluid connection between the outlet section (24) and the glue feeding channel (22).

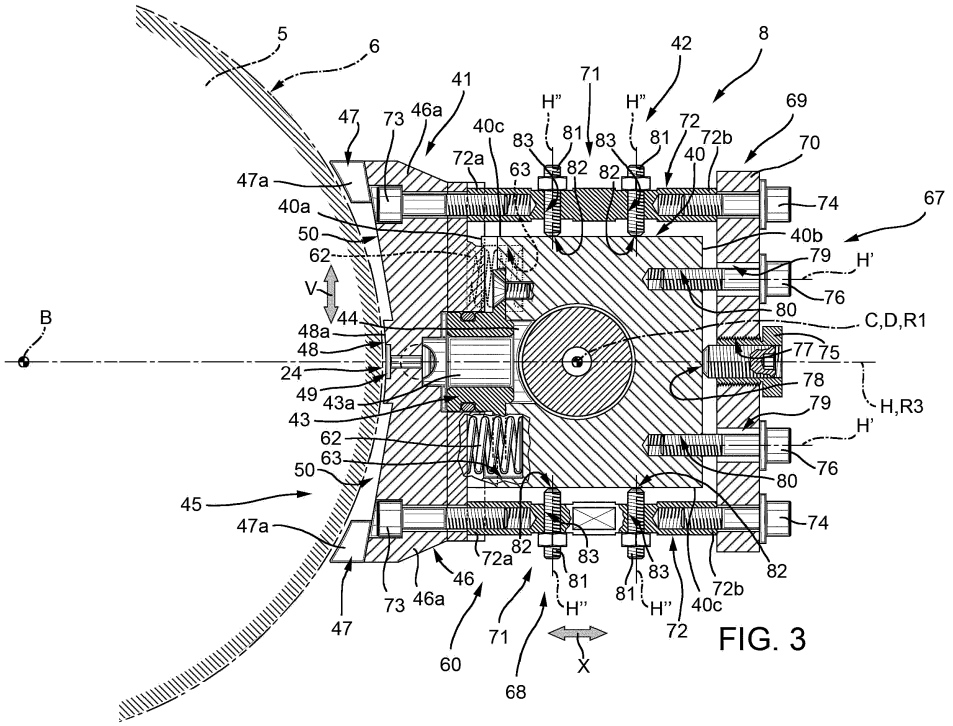


FIG. 3

EP 3 257 767 A1

Description

TECHNICAL FIELD

[0001] The present invention regards a glue application unit for a labeling apparatus for applying glue on labels prior to their application on receptacles, such as containers, bottles, cans or the like.

BACKGROUND ART

[0002] The packaging of food or non-food products into respective receptacles comes along with a labeling of the receptacles with respective label sheets during a labeling process. The label sheets serve e.g. to transmit the respective brand of the packaged product and, thus, to draw the attention of final customers once the product has been delivered to and exposed in store houses. Additionally, each label sheet provides the customer with important information about the stored product. The overall appearance of the label sheet applied on a respective receptacle is of significant importance. Thus, the quality of the labeling process itself must guarantee a correct, repeatable and clean attachment of the label. Otherwise, a significant number of receptacles are discarded leading to increasing production costs.

[0003] In general, labeling of the receptacles is realized before, during or after filling of the receptacles themselves.

[0004] E.g. in roll-feed labeling processes, a succession of receptacles is advanced along a predetermined receptacle path towards a receptacle treatment apparatus, such as a labeling apparatus, which is adapted to label each receptacle. The respective label sheet originates from an endless web of label material. The endless web is fed along a predetermined label material path at first to a cutting unit, in which the endless web is cut in order to obtain a succession of single label sheets with predetermined sizes and finally this succession of single label sheets is fed into the receptacle treatment apparatus, in which each label is attached to one respective receptacle.

[0005] In general, prior to attaching one label sheet onto one respective receptacle, a defined layer of glue is applied onto the backside of such label sheet by means of a glue application unit.

[0006] A typical glue application unit comprises:

- a glue roller extending along a central axis and adapted to rotate around the central axis and to apply the layer of glue from its outer lateral surface onto the backside of the label sheet to be attached on a respective receptacle; and
- a glue feeding device adapted to continuously feed glue to glue roller and including a glue storage reservoir;
- a glue distribution bar having a longitudinal extension along an extension axis and being adapted to receive the glue from the glue feeding device and to selectively spread the glue in a defined manner on the outer lateral surface of the glue roller.

[0007] Typically, the glue distribution bar needs to be correctly aligned and positioned with respect to the glue roller so that the central axis of the glue roller and the extension axis of the glue distribution bar are parallel to one another and the glue distribution bar is placed adjacent to the glue roller. The alignment and the positioning of the glue distribution bar must allow for the correct formation of a veil of glue between the glue distribution bar and the glue roller as otherwise the glue cannot be correctly transferred onto the glue roller which would inevitably lead to a significant reduction of the quality of the overall gluing process.

[0008] As well, the glue distribution bar must be positioned and aligned in such a manner that, in use, unwanted contacts between the glue roller and the glue distribution bar are avoided as also these lead to a significant reduction of the overall gluing process.

[0009] Furthermore, in use, the relative positions and alignments between the glue roller and the glue distribution bar must remain stable and must not be subject to variations.

[0010] Thus, the admitted tolerances are minimal which means e.g. that the production of the glue roller and the glue distribution bar must be very accurate. As well, the tolerances between the orientations of the glue roller and the glue distribution bar are minimal; i.e. the rotation axis and the extension axis cannot significantly deviate from being parallel to one another.

[0011] As the needed tolerances can be hardly achieved, the alignment of the glue roller and the glue distribution bar often relies on a first alignment step and then on operation of the glue roller without the application of glue for preparing the glue distribution bar to the specific glue roller by wearing off of the glue distribution bar for finally, obtaining the desired alignment and arrangement of the glue distribution bar with respect to the glue roller.

[0012] Even though the glue application units known allow for the alignment and arrangement of the glue roller and the glue application bar, the need is felt to provide for a glue application unit providing for an improved and facilitated manner of aligning the glue distribution bar with respect to the glue roller.

DISCLOSURE OF INVENTION

[0013] It is an object of the present invention to provide a glue application unit providing, in a straightforward and low-cost manner, for an improved and a facilitated manner for aligning and arranging a glue distribution bar with respect to a glue roller of the glue application unit.

[0014] According to the present invention, there is provided a glue application unit as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a glue application unit according to the present invention with parts removed for clarity;
Figure 2 shows a larger-scale perspective view of a glue distribution bar assembly of the unit of Figure 1 in a disassembled configuration;
Figure 3 shows a sectioned top view of the glue distribution bar assembly of Figure 2 in an assembled configuration interacting with a glue roller of the glue application unit;
Figure 4 shows a partially-sectioned side view of the glue distribution bar assembly of Figure 3;
Figure 5 shows a front-side view of the glue distribution bar assembly of Figures 3 and 4, with parts removed for clarity;
Figure 6 shows a rear-side view of glue distribution bar assembly of Figures 3 to 5, with parts removed for clarity; and
Figure 7 shows a side-view of the glue distribution bar assembly in a misaligned state with respect to the glue roller.

BEST MODE FOR CARRYING OUT THE INVENTION

[0016] Number 1 in Figure 1 indicates as a whole a glue application unit for a labeling apparatus 2 (only partially shown to the extent necessary to the comprehension of the present invention) adapted to apply a layer of melted glue on single label sheets 3 to be stuck on respective receptacles (known per se and not shown), such as bottles, containers, vessels, cans etc.

[0017] In particular, labeling apparatus 2 comprises a transfer drum 4 having a vertical axis A and being rotatable about axis A itself. Transfer drum 4 further has suction means (not shown and known as such) for holding single label sheets 3 on its outer surface. Additionally, during its rotation, the transfer drum 4 is configured to advance each single label sheet 3 along a circular path P around axis A first towards glue application unit 1 and, after application of a layer of melted glue, towards an application station (not shown and known per se) for attaching each label sheet 3 on a respective receptacle.

[0018] Glue application unit 1 comprises:

- a glue roller 5 mounted tangentially adjacent to transfer drum 4, adapted to rotate about a vertical axis B, parallel to axis A, and having an outer lateral surface 6;
- a glue feeding device 7 adapted to continuously feed glue to outer lateral surface 6 of glue roller 5; and
- a glue distribution bar assembly 8 interposed between glue roller 5 and glue feeding device 7 and arranged peripherally adjacent to glue roller 5 at a glue application station 9 to selectively spread glue in a defined manner on outer lateral surface 6 of glue roller 5.

[0019] Glue application unit 1 further comprises an electric motor 10, which rests on a support plate 11, placed above glue roller 5, and has an output shaft 12 angularly connected to a core of the glue roller 5 itself to rotate the latter about axis B.

[0020] Glue application unit 1 also comprises a glue scraper 13, which, in the example shown, is defined by a curved blade projecting downwards from support plate 10 and arranged at the periphery of glue roller 5 and at a certain radial distance from outer lateral surface 6 of the glue roller 5 itself. Scraper 13 is adapted to remove the excess of glue from glue roller 5 during rotation thereof and to smooth the surface of the glue layer applied onto lateral surface 6 of the glue roller 5.

[0021] In greater details, the glue feeding device 7 comprises:

- a glue storage reservoir 18 (known as such) adapted to store and heat melted glue;
- a glue feeding conduit 19 connected to glue storage reservoir 18 and to glue distribution bar assembly 8; and
- pumping means 20 interposed between glue storage reservoir 18 and glue distribution bar assembly 8 and adapted to pump melted glue through glue feeding conduit 19 from glue storage reservoir 18 to distribution bar assembly 8.

[0022] Pumping means 20 can run at variable speed in accordance with varying rotation speeds of transfer drum 4.

[0023] Glue feeding device 7 has a fixed support base structure 21 carrying on top glue roller 5 and glue distribution bar assembly 8.

[0024] In the example shown in Figure 1, glue storage reservoir 18 is defined by a sump formed into the support base structure 21 and positioned below with respect to glue roller 5 and glue distribution bar assembly 8. In this way, support base structure 21 is configured to receive and to guide by gravity the flow of excess glue removed by glue scraper 13 from glue roller 5 towards glue storage reservoir 18.

[0025] Glue feeding conduit 19 and pumping means 20 are also provided within the support base structure 21. Glue feeding conduit 19 has a terminal conduit portion 19a located at the bottom of glue bar assembly 8 and connected thereto for supplying it melted glue.

[0026] With particular reference to Figures 1 and 2, glue distribution bar assembly 8 comprises a glue feeding channel 22 connected to glue feeding conduit 19 of glue feeding device 7 and having at least one outlet port 23 for supplying glue to outer lateral surface 6 of glue roller 5.

[0027] Additionally, glue distribution bar assembly 8

comprises an outlet section 24 facing outer lateral surface 6 of glue roller 5 and being in fluidic connection with outlet port 23 so as to transfer glue onto outer lateral surface 6 itself.

[0028] Thus, in practice, glue is pumped by pumping means 20 from glue storage reservoir 18 through glue feeding conduit 19 to glue feeding channel 22. Then, glue further flows through glue feeding channel 22 to outlet port 23 and enters outlet section 24.

[0029] As visible in particular in Figures 1 and 2, glue distribution bar assembly 8 advantageously comprises a glue distribution bar 25 carrying outlet section 24 and being arranged spaced apart and peripherally adjacent to glue roller 5 at station 9.

[0030] Preferably, glue distribution bar assembly 8 also comprises a bar support post 26, in particular mounted on top of support base structure 21, and presenting the glue feeding channel 22 and outlet port 23.

[0031] In particular, glue distribution bar 25 is removably coupled onto bar support post 26.

[0032] In more detail, bar support post 26 has a longitudinal axis C, substantially extending parallel to axes A and B.

[0033] As shown in particular in Figure 1, glue distribution bar assembly 8 is arranged on the opposite side of glue roller 5 with respect to transfer drum 4

[0034] Glue distribution bar 25 partially covers bar support post 26 except a base portion 26a thereof. Glue distribution bar 25 and bar support post 26 are fastened to each other by releasable fastening means 27 (known per se and not further described).

[0035] A main channel portion 22a of glue feeding channel 22 extends coaxial to axis C and has one lower end 22b, configured to establish a fluid connection with terminal conduit portion 19a of glue feeding conduit 19, and one upper end 22c connected to outlet port 23. In particular, outlet port 23 extends radially from upper end 22c of main channel portion 22a to the outer lateral surface of bar support post 26 so as to communicate in use with outlet section 24 of glue distribution bar 25.

[0036] Furthermore, bar support post 26 comprises at least one sensor element 32, such as a resistance temperature detector or a thermocouple, configured to measure the temperature of the bar support post 26 itself. In particular, sensor element 32 is internally integrated in a position parallel to, and facing, axis C into bar support post 26.

[0037] Bar support post 26 also has at least one heating element 33, such as a resistance heater, adapted to heat bar support post 26 and consequently the glue flowing through glue feeding channel 22 and outlet port 23 so as to keep the glue in a melted state. Heating element 33 is arranged inside of bar support post 26 in a position parallel to, and facing, axis C and spaced apart from sensor element 32.

[0038] Furthermore, sensor element 32 and heating element 33 are connected by respective electrical connecting means (known per se and not shown) to a glue application control unit (known as such and not shown) of glue application unit 1, in particular carried by support base structure 21.

[0039] Preferentially, bar support post 26 presents a truncated cone configuration tapered towards its top.

[0040] With particular reference to Figures 3 and 4, glue distribution bar 25 comprises:

- a fixing block 40 arranged spaced apart from glue roller 5
- a moveable glue distribution group 41 carrying outlet section 24, arranged in particular peripherally adjacent to glue roller 5 at station 9;;
- alignment means 42 adapted to align glue distribution group 41 with respect to glue roller 5, in particular with respect to outer lateral surface 6; and
- a glue feeding portion 43 at least partially arranged between fixing block 40 and glue distribution group 41 and adapted to establish a fluid connection between outlet section 24 and the glue feeding channel 22, in particular through a tubular section 43a.

[0041] In more detail, fixing block 40 is removably coupled to bar support post 26 in such a manner to at least partially cover bar support post 26, in particular except of base portion 26a. Fixing block 40 is fastened to bar support post 26 by fastening means 27.

[0042] Furthermore, fixing block 40 has a longitudinal axis D which, in use, is substantially coaxial with axis C of bar support post 26. Fixing block 40 has a substantially parallelepiped shape and an inner configuration complementary to the truncated cone configuration of bar support post 26. In particular, fixing block 40 has an outer front face 40a facing, in use, outer lateral surface 6, an outer rear face 40b opposite of front face 40a and outer lateral sides 40c, in particular being orthogonal to faces 40a and 40b.

[0043] Preferably, fixing block 40 has a passage 44 adapted to establish, in use, the fluid connection of glue distribution group 41 and glue feeding channel 22. More specifically, passage 44 is configured to at least partially receive glue feeding portion 43. Even more specifically, glue feeding portion 43 partially houses within passage 44 and is fixed to fixing block 40.

[0044] With particular reference to Figures 3 to 5, glue distribution group 41 extends along a longitudinal axis E, in particular axis E being aligned, in use, substantially parallel to axis B of glue roller 5.

[0045] Furthermore, glue distribution group 41 comprises a contact portion 45 adapted to at least partially contact outer lateral surface 6. Furthermore, contact portion 45 has at least partially a shape complementary to outer lateral surface 6.

[0046] In more detail, contact portion 45 has a carrier plate section 46 carrying outlet section 24.

[0047] Furthermore, contact portion 45 comprises a plurality of upper and lower protuberances or horns 47, in the particular example shown four, protruding, in use,

towards outer lateral surface 6 and adapted to contact outer lateral surface 6. Furthermore, horns 47 are configured to collaborate with actuation assembly 60 of glue distribution group 41 for aligning glue distribution group 41, in particular of contact portion 45 itself with glue roller 5, in particular outer lateral surface 6 of glue roller 5. Preferably, each horn 47 has a front portion 100a having a shape complementary to outer lateral surface 6. In particular, each horn 47 is connected to carrier plate section 46, even more particular at one respective lateral side section 46a of carrier plate section 46.

[0048] Contact portion 45 also comprises a central elongated protrusion 48 (see figure 3) extending along axis E and delimiting a transferring zone 49 through which glue is transferred from outlet section 24 to outer lateral surface 6 of glue roller 5. In particular, protrusion 48 is carried by carrier plate section 46 and protrudes towards outer lateral surface 6. Furthermore, protrusion 48 is adapted to partially contact outer lateral surface 6. Preferably, protrusion 48 has a front section 48a having a shape complementary to outer lateral surface 6.

[0049] Furthermore, contact portion 45 at least partially delimits glue-free spaces 50, in the example shown two, in particular interposing in between transferring zone 49.

[0050] In more detail, glue-free spaces 50 are partially delimited by horns 47 and protrusion 48. In use, glue is transferred from glue feeding channel 22 only to transferring zone 49. Glue-free spaces 50 are excluded from receiving glue.

[0051] Additionally, glue distribution group 41 comprises a glue feeding assembly 54, in particular defining outlet section 24. Glue feeding assembly 54 is adapted to be in fluid connection with glue feeding channel 22 through glue feeding portion 43 and to feed glue to transferring zone 49.

[0052] In more detail, glue feeding assembly 54 comprises:

- a first glue feeding slot 55 substantially extending parallel to axis E and facing fixing block 40 and adapted to receive glue from glue feeding portion 43;
- a second glue feeding slot 56, in particular carried by protrusion 48, substantially extending parallel to axis E configured to face, in use, outer lateral surface 6 and adapted to receive glue from glue feeding slot 55 and to feed the glue to transferring zone 49;

- a separator portion 57 arranged between and dividing glue feeding grooves 55 and 56; and
- a plurality of feeding holes 58 provided on separator portion 57 and establishing a fluid connection between glue feeding slot 55 and glue feeding slot 56.

[0053] Glue distribution group 41 also comprises a seat portion 59 adapted to moveably and partially house glue feeding portion 43, in particular in such a manner to allow for a relative movement between glue distribution group 41 and glue feeding portion 43.

[0054] With particular reference to Figures 3, 4, 6 and 7, alignment means 42 are adapted to align glue distribution group 41 to the shape of outer lateral surface 6.

[0055] More specifically, alignment means 42 are adapted to orient and position glue distribution group 41 with respect to glue roller 5, in particular with respect to outer lateral surface 6. Even more specifically, alignment means 42 are configured to orient glue distribution group 41 in such a manner that axis E is parallel to axis B; and to position glue distribution group 41 in such a manner so that, in use, a veil of glue forms in between of outer lateral surface 6 and outlet section 24, in particular in between outer lateral surface 6 and protrusion 48.

[0056] In even more detail, alignment means 42 are configured to rotate glue distribution group 41, preferably in three dimensions for changing the orientation of glue distribution group 41. In particular, alignment means 42 are configured to rotate glue distribution group 41 around a first rotation axis R1 parallel to axis D of fixing block 40, around a second rotation axis R2 perpendicular to rotation axis R1 and axis D and a third rotation axis R3 perpendicular to rotation axes R1 and R2 and axis D.

[0057] In more detail, alignment means 42 comprise:

- contact portion 45; and
- an actuation assembly 60 adapted to actuate alignment of glue distribution group 41 and to collaborate with contact portion 45 for aligning glue distribution group 41 with respect to glue roller 5, in particular with respect to outer lateral surface 6 and/or for rotating glue distribution group 41.

[0058] In more detail, actuation assembly 60 is configured to displace glue distribution group 41 towards outer lateral surface 6 so as to force glue distribution group 41, in particular contact portion 45, even more particular at least horns 47 and preferably also protrusion 48 into contact with outer lateral surface 6.

[0059] More specifically, actuation assembly 60 in collaboration with glue distribution group 41, in particular in collaboration with contact portion 45, even more particular in collaboration with at least horns 47 and preferably also with protrusion 48 is also adapted to actuate orientation of axis E of glue distribution group 41 parallel to axis B of glue roller 5. Furthermore, actuation assembly 60 is adapted to lock the alignment, in particular the orientation and position of glue distribution group 41.

[0060] In more detail, actuation assembly 60 is adapted to actuate rotation of glue distribution group 41 in three dimensions, in particular around rotation axes R1, R2 and R3.

[0061] In more detail, actuation assembly 60 comprises a tensioning device 61 adapted to interact with glue distribution group 41 and to force, in use, glue distribution group 41 away from fixing block 40 and towards outer lateral surface 6, in particular for establishing contact between contact portion 45 and outer lateral surface 6, in particular at least between horns 47 and preferably also

protrusion 48 and outer lateral surface 6. Tensioning device 61 is also configured to induce at least partially an auto-alignment of glue distribution group 41 due to the action of tensioning device 61 and the interaction of contact portion 45, in particular of at least horns 47, but preferentially also of protrusion 48 with outer lateral surface 6.

[0062] Tensioning device 61 comprises a plurality of tensioning members 62, in the specific example four springs, each one interacting with fixing block 40 and glue distribution group 41 and adapted to exert, in particular in collaboration, a force on glue distribution group 41, in particular acting away from fixing block 40 and towards outer lateral surface 6.

[0063] More specifically, the plurality of tensioning members 62 is designed to pre-tension, in use, glue distribution group 41 towards outer lateral surface 6 of glue roller 5, in particular for establishing contact between contact portion 45 and outer lateral surface 6, preferentially for establishing contact between at least horns 47, but preferentially also of protrusion 48 with outer lateral surface 6.

[0064] Even more specifically, each tensioning member 62 is partially housed within one respective recess 63 provided on fixing block 40 and contacts carrier plate section 46.

[0065] In particular, tensioning members 62 and horns 47 and protrusion 48 are configured to cooperate, in particular during alignment of glue distribution group 41 to glue roller 5, with outer lateral surface 6 for aligning glue distribution group 41 to glue roller 5.

[0066] Actuation assembly 60 also comprises:

- a locking and displacement device 67 adapted to move at least partially glue distribution group 41 along a direction X orthogonal to axis D to or away from outer surface 6 of glue roller 5 and respectively away or to fixing block 40 and adapted to lock glue distribution group 41 in direction X; and
- a locking device 68 adapted to lock glue distribution group 41 into a direction V orthogonal to direction X and axis D; i.e. direction V is transversal with respect to fixing block 40.

[0067] Actuation assembly 60 further comprises a support structure 69 coupling devices 67 and 68 to glue distribution group 41.

[0068] In more detail, support structure 69 comprises:

- one or more transversal bars 70, two in the example shown, coupled to fixing block 40, in particular to rear face 40b, orthogonally to axis D and direction X; and
- a plurality of screw assemblies 71, four in the example of Figures 3 to 7, each one arranged parallel to direction X and connected to section 46, in particular to one respective lateral side section 46a of section 46 and to one respective transversal bar 70.

[0069] In more detail, transversal bars 70 are parallel to and spaced apart from each other and are arranged in the area of respectively a bottom or top portion of fixing block 40.

[0070] In more detail, each screw assembly 71 comprises:

- a nut-screw connecting member 72 interposed between the relative lateral side section 46a and the respective transversal bar 70;
- a screw member 73 adapted to connect one end portion 72a of nut-screw connecting member 72 to the respective lateral side section 46a; and
- a screw element 74 fixed to one opposite end portion 72b of nut-screw connecting member 72 and cooperating with one respective terminal portion of the relative transversal bar 70.

[0071] With particular reference to Figures 3 and 4, device 67 is configured to lock and displace support structure 69, in particular to selectively displace transversal bars 70 into direction X and to lock transversal bars 70 in direction X.

[0072] In more detail, device 67 comprises:

- a plurality of pushing screw members 75, in the example shown two, adapted to rotate around one respective rotation axis H parallel to direction X for moving glue distribution group 41 and each one designed to cooperate with one respective transversal bar 70; and
- one or more locking screw members 76, in the example shown four, adapted to rotate around one respective rotation axis H' parallel to direction X and configured to lock glue distribution group 41 in position, in particular indirectly through locking support structure 69 in position.

[0073] In greater detail, each pushing screw member 75 extends through a central threaded hole 77 of the respective transversal bar 70 and is designed to contact fixing block 40, in particular at a relative contact area 78 provided on rear face 40b of fixing block 40.

[0074] Furthermore, each locking screw member 76 is arranged parallel and adjacent to one respective screw assembly 71. Preferably, each locking screw member 76 extends with play through one respective through-hole 79 of the respective transversal bar 70 and interacts with a respective threaded hole 80 provided on fixing block 40. More specifically, each threaded hole 80 is provided on a peripheral area of rear face 40b of fixing block 40.

[0075] Device 68 is configured to fix the position of the support structure 69 into direction V.

[0076] Device 68 comprises a plurality of positioning screw members 81, in the embodiment of Figures 3 to 7 eight (not all shown), each one interacting with one respective screw assembly 71 and fixing block 40, in particular with one respective lateral side 40c and being adapted to rotate around one respective rotation axis

H" parallel to direction V and orthogonal to direction X and to axis D. In particular, positioning screw members 81 are designed to lock screw assemblies 71, in particular the respective nut-screw assemblies 72 with respect to the respective lateral side 40c.

[0077] In more detail, each positioning screw member 81 interacts with one respective contact surface 82 provided on the respective lateral side 40c of fixing block 40. Furthermore, each positioning screw member 81 extends through one respective threaded passage 83 of the respective screw assembly 71.

[0078] In particular, in the specific example shown, there are provided four relative contact surfaces 82 on each one of lateral sides 40c. Furthermore, each screw assembly 71 has two threaded passages 83 and, accordingly, each screw assembly 71 interacts with two respective positioning screw members 81.

[0079] Thus, by rotation and collaboration of positioning screw members 81 it is possible to laterally lock support structure 69.

[0080] Overall, actuation of actuation assembly 60, in particular by action of tensioning members 62 and actuation of devices 67 and 68 allows obtaining and maintaining, in use, the required inclination of axis E of glue distribution group 41 with respect to axis D of fixing block 40.

[0081] Thus, by preventively loosening locking screw members 76, pushing screw members 75 and positioning screw members 81 tensioning device 61, in particular tensioning members 62 pre-tension glue distribution group 41 towards outer lateral surface 6. In particular, tensioning device 61 forces contact portion 45, in particular horns 47 and preferably also protrusion 48 to contact outer lateral surface 6. Then, due to the interaction between contact portion 45, in particular horns 47 and preferentially also protrusion 48 and outer lateral surface 6 and the action of tensioning device 61 leads to alignment of glue distribution group 41 to outer lateral group 95, in particular to the shape of outer lateral surface 6. It must be noted that the most satisfying alignment results are obtained with the shapes of front faces 47a of horns 47 and preferably also with front section 48a of protrusion 48 being complementary to the shape of outer lateral surface 6.

[0082] Thus, actuation assembly 60 is designed to initiate at least partially an auto-alignment of glue distribution group 41, in particular as a result of the action of tensioning device 61 and the interaction of glue distribution group 41 itself, in particular of contact portion 45, even more particular of horns 47 and preferentially also of protrusion 48 with outer lateral surface 6.

[0083] Hence, in the case of a misalignment (see e.g. Figure 7) between glue roller 5 and glue distribution group 41 (i.e. axis E is not parallel to axis B) the action of tensioning device 61, in particular of tensioning members 62 forces contact portion 45 onto outer lateral surface 6 which at first does not fully contact outer lateral surface 6 (i.e. not all of horns 47 and/or protrusion 48 fully contact outer lateral surface 6). Then, as a result of the forces acting the glue distribution group 41 orients so that contact portion 45 fully contacts outer lateral surface 6 (i.e. all of horns 47 and preferentially also protrusion 48 fully contact outer lateral surface 6). Thereby, an alignment position (not shown) of glue distribution group 41 is established.

[0084] By then rotating locking screw members 76, pushing screw members 75 and positioning screw member 81 glue distribution group 41 is locked in the alignment position.

[0085] By then preventively loosening retractor screw members 76, screwing rotation of each pushing screw member 75 into the respective transversal bar 70 leads to a displacement of glue distribution group 41 parallel to direction X and away from outer lateral surface 6 of glue roller 5. In particular, glue distribution group 41 is moved into a working position (see e.g. Figure 13) at which contact portion 45, in particular horns 47 and protrusion 48 are distanced, in particular slightly distanced from outer lateral surface 6.

[0086] Figure 7 shows a misalignment, for example a tangential angular misalignment between fixing block 40 and glue roller 5, in which axis B of glue roller 5 is disposed around the ideal axis B' of glue roller 5. This misalignment is compensated for by activating alignment means 42, in particular by operating actuation assembly 60 in the way described above.

[0087] It must be understood that in an equivalent manner a misalignment of bar support post 26 and/or of fixing block 40 could be compensated for.

[0088] In use, prior to the labeling and consequently the gluing process itself, glue distribution bar assembly 8 is positioned with respect to support base structure 21. Glue distribution bar 25 is arranged on bar support post 26. In particular, fixing block 40 is arranged on bar support post 26 in such a manner to at least partially cover bar support post 26. Then fixing block 40 is fixed to bar support post 26 by fastening fastening means 27.

[0089] After that alignment means 42 are activated in the manner described above for aligning, in particular for orienting and positioning glue distribution group 41 with respect to glue roller 5. In brief, during alignment of glue distribution group 41, glue distribution group 41 is at first positioned in the alignment position at which contact portion 45 interacts with outer lateral surface 6, in particular so that upper and lower horns 47 and preferentially also protrusion 48 contact outer lateral surface 6. Then, glue distribution group 41 is moved to the working position at which contact portion 45, in particular horns 47 and protrusion 48 are distanced from outer lateral surface 6.

[0090] After completing of positioning of glue distribution bar assembly 8 and of aligning glue distribution group 41, glue is pumped by pumping means 20 from glue storing reservoir 18 to glue feeding channel 22 through glue feeding conduit 19. Glue exits from outlet port 23 and enters outlet section 24 of glue distribution bar 25. In particular, glue exits from outlet port 23 and first enters

into passage 44 and glue feeding portion 43 and flows through passage 44 and portion 43a to glue feeding assembly 54 so as to feed the glue to outlet section 24. Even more particularly, glue flows from glue feeding portion 43 to groove 55 and through holes 58 to groove 56.

[0091] Finally, a veil of glue is established between outer lateral surface 6 of glue roller 5 and outlet section 24 of glue distribution bar 25 and glue is transferred on the rotating glue roller 5. In particular, the veil is established along and in the area of protrusion 48.

[0092] During further rotation of glue roller 5, glue in excess is eventually removed by glue scraper 13. Excess glue is returned by gravity to the reservoir 18. Finally, a layer of glue is transferred from outer lateral surface 6 of glue roller 5 onto the backside of respective label sheets 3, which are conveyed along circular path P by rotating transfer drum 4.

[0093] The advantages of glue application unit 1 according to the present invention will be clear from the foregoing description.

[0094] In particular, glue distribution assembly 8 provides for easy and reliable means of aligning glue distribution bar 25 with respect to glue roller 5. The fixing block 40 is spaced apart from glue roller 5 and is fixed in position. Moveable glue distribution group 41 allows being easily and reliably oriented with respect to outer lateral surface 6 of glue roller 5.

[0095] A further advantage lies in glue distribution bar 25 having aligning means 42 which partially allow for an auto-alignment process with limited intervention of an operator.

[0096] An even further advantage lies in the action of tensioning device 61 as during the alignment of glue distribution group 41, glue distribution group 41 is pressed onto outer lateral surface 6 and is retained onto outer lateral surface 6 without the intervention of an operator.

[0097] It is a further advantage to have a plurality of upper and lower horns 47 contacting during alignment outer lateral surface 6 at varying sections of outer lateral surface6 providing for a precise orientation of glue distribution group 41 with respect to glue roller 5. The precision is even further increased by horns 47 having front faces 47a being complementary to the shape of outer lateral surface 6.

[0098] As well, glue distribution bar assembly 8 provides for a transfer zone 49 having limited extensions facilitating the distribution of glue onto outer lateral surface 6.

[0099] A further advantage is to arrange fixing block 40 and bar support post 26 as this allows for a reliable and repeatable positioning of glue distribution bar 25. In this respect, it is of further advantage that the inner configuration of fixing block is complementary to the truncated cone configuration of bar support post 26 further improving the reliability and repeatability of the arrangement of fixing block 40.

[0100] Clearly, changes may be made to glue application unit 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0101] It must be understood that, in a possible alternative embodiment not shown, glue feeding channel 22 may have more than one outlet port 23 and each one of the outlet ports may be adapted to establish a fluidic connection with outlet section 24.

[0102] It must be further understood that, alternatively to the embodiment shown, glue distribution bar 25 may be configured to fully cover bar support post 26.

[0103] In an even further embodiment not shown, glue application unit 1 may comprise positioning means adapted to change the relative position between glue roller 5 and glue distribution bar 25. Preferably, the positioning means may be configured to move bar support post 26 to or away from glue roller 5.

[0104] In another embodiment not shown, protrusion 48 may be designed in such a way that protrusion 48 remains distanced from outer lateral surface 6 with horns 47 contacting outer lateral surface 6 during the alignment of glue distribution group 41.

[0105] It must be noted that in the embodiment disclosed preferably outlet port 23 is arranged, as shown, on bar support post 26 at a central area thereof as this permits to fix glue feeding portion 43 to fixing block 40 in the area of the center of gravity of fixing block 40. Alternatively, outlet port 23 could also be arranged at other areas of bar support post 26, e.g. at a top area (not show). Then, glue feeding portion 43, passage 44 of fixing block 40 and seat 59 of glue distribution group 41 would be designed accordingly.

Claims

1. Glue application unit (1) for a labeling apparatus (2) comprising:

- a glue roller (5) having an outer lateral surface (6) adapted to apply melted glue on label sheets (3);
- a glue feeding device (7) for feeding melted glue to the glue roller (5);
- a glue distribution bar assembly (8) arranged adjacent to the glue roller (5) and having a glue feeding channel (22), selectively connected to the glue feeding device (7), and an outlet section (24), adapted to selectively transfer the glue from the glue feeding channel (22) to the glue roller (5);

characterized in that the glue distribution bar assembly (8) comprises a glue distribution bar (25), carrying the outlet section (24) and the glue distribution bar (25) comprising:

- a fixing block (40) spaced apart from the glue roller (5);

- a moveable glue distribution group (41) carrying the outlet section (24);
- alignment means (42) adapted to align the glue distribution group (41) with respect to the glue roller (5) and/or to rotate the glue distribution group (41); and
- a glue feeding portion (43) adapted to establish a fluid connection between the outlet section (24) and the glue feeding channel (22).

2. The glue application unit according to claim 1, wherein the glue distribution group (41) comprises a contact portion (45) adapted to at least partially contact the outer lateral surface (6) of the glue roller (5); and wherein the alignment means (42) comprise an actuation assembly (60) adapted to actuate alignment of the glue distribution group (41) with the glue roller (5) and to collaborate with the contact portion (45) for aligning and/or rotating the glue distribution group (41) with respect to the glue roller (5).

3. The glue application unit according to claim 2, wherein the actuation assembly (60) comprises a tensioning device (61) adapted to force the glue distribution group (41) towards the outer lateral surface (6) of the glue roller (5) for establishing contact between the contact portion (45) and the outer lateral surface (6).

4. The glue application unit according to claim 3, wherein the tensioning device (61) comprises a plurality of tensioning members (62) interacting with the fixing block (40) and the glue distribution group (41) and adapted to exert a force onto the glue distribution group (41) acting towards the outer lateral surface (6); wherein the contact portion (41) comprises a plurality of protuberances (47) adapted to contact the outer lateral surface (6); the tensioning members (62) and the protuberances (47) being configured to cooperate with the outer lateral surface (6) for aligning the glue distribution group (41) to the glue roller (5).

5. The glue application unit according to any one of claims 2 to 4, wherein the actuation assembly (60) comprises

- a locking and displacement device (67) adapted to move at least partially the glue distribution group (41) into a first direction (X) to or away from the outer lateral surface (6) of the glue roller (5) and to lock the glue distribution group (41) in the first direction (X); and
- a locking device (68) adapted to lock the glue distribution group (41) into a second direction (V) orthogonal to the first direction (X) and transversal to the fixing block (40).

6. The glue application unit according to any one of the preceding claims, wherein the glue distribution group (41) comprises a central elongated protrusion (48) at least partially delimiting a transferring zone (49) through which glue is transferred from the outlet section (24) to the outer lateral surface (6) of the glue roller (5).

7. The glue application unit according to claim 6, wherein the glue feeding group (41) is coupled to the fixing block (40) and the glue feeding portion (43) is connected to the fixing block (40) and the glue distribution group (41).

8. The glue application unit according to claim 6 or 7, wherein the glue distribution group (41) also comprises a plurality of protuberances (47) at least partially delimiting in cooperation with the central elongated protrusion (48) at least two glue-free spaces (50); wherein the transferring zone (49) is interposed between the at least two glue-free spaces (50).

9. The glue application unit according to any one of the preceding claims, wherein the glue distribution assembly (8) further comprises a bar support post (26) which presents the glue feeding channel (22) and which removably carries the fixing block (40).

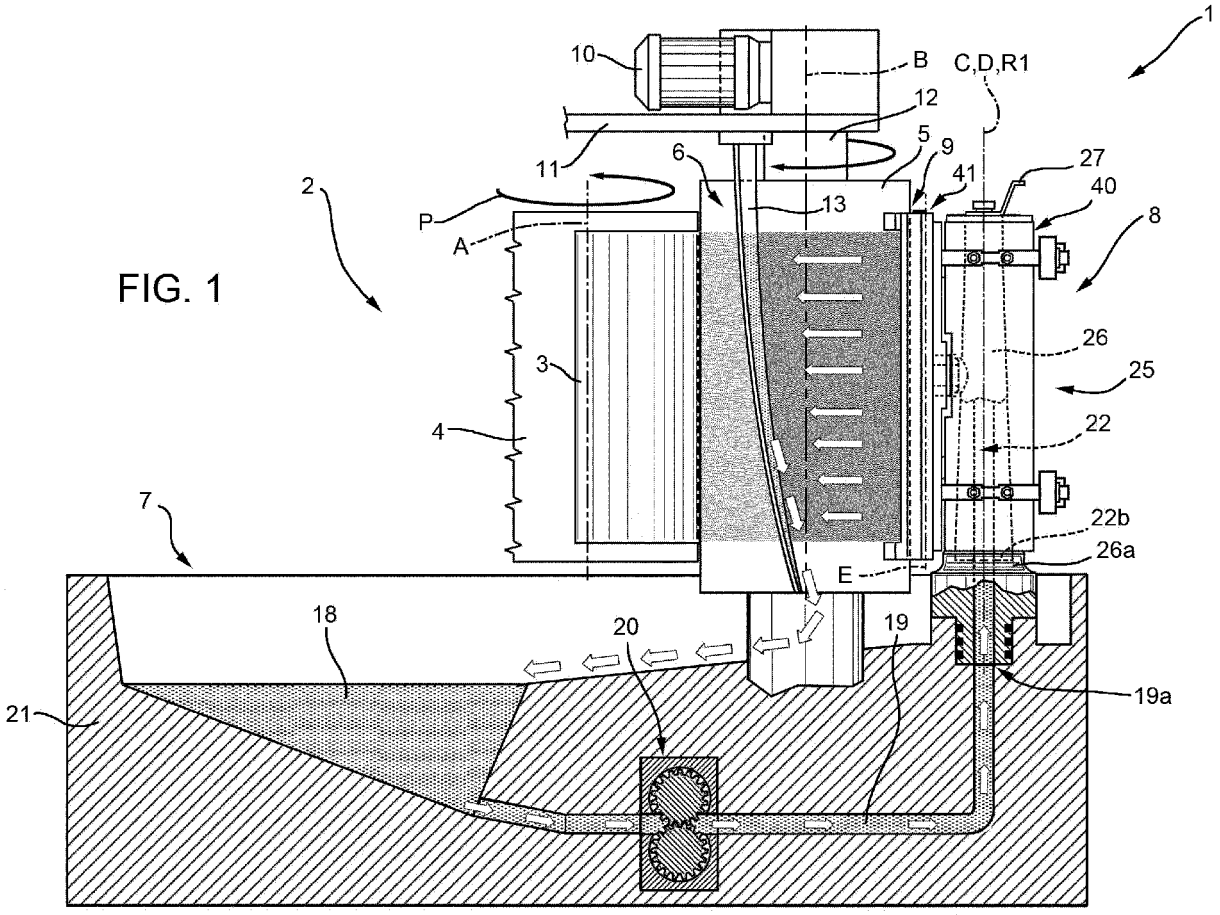
10. The glue application unit according to claim 9, wherein the bar support post (26) comprises at least one sensor element (32) configured to measure the temperature of the bar support post (26) itself.

11. The glue application unit according to claim 9 or 10, wherein the bar support post (26) comprises at least one heating element (33) adapted to heat the glue flowing through the glue feeding channel (22).

12. The glue application unit according to any one of claims 9 to 11, wherein the bar support post (26) has a truncated cone configuration, and wherein the fixing block (40) has an internal shape complementary to the truncated cone configuration of the bar support post (26).

13. The glue application unit according to any one of the preceding claims, further comprising positioning means adapted to change the relative position between the glue roller (5) and the fixing block (40) of the glue distribution assembly (8).

FIG. 1


1
10
B
C,D,R1
12
11
6
5
9
41
27
40
2
P
A
13
8
26
3
25
4
22
7
22b
26a
E
18
20
19
19a
21

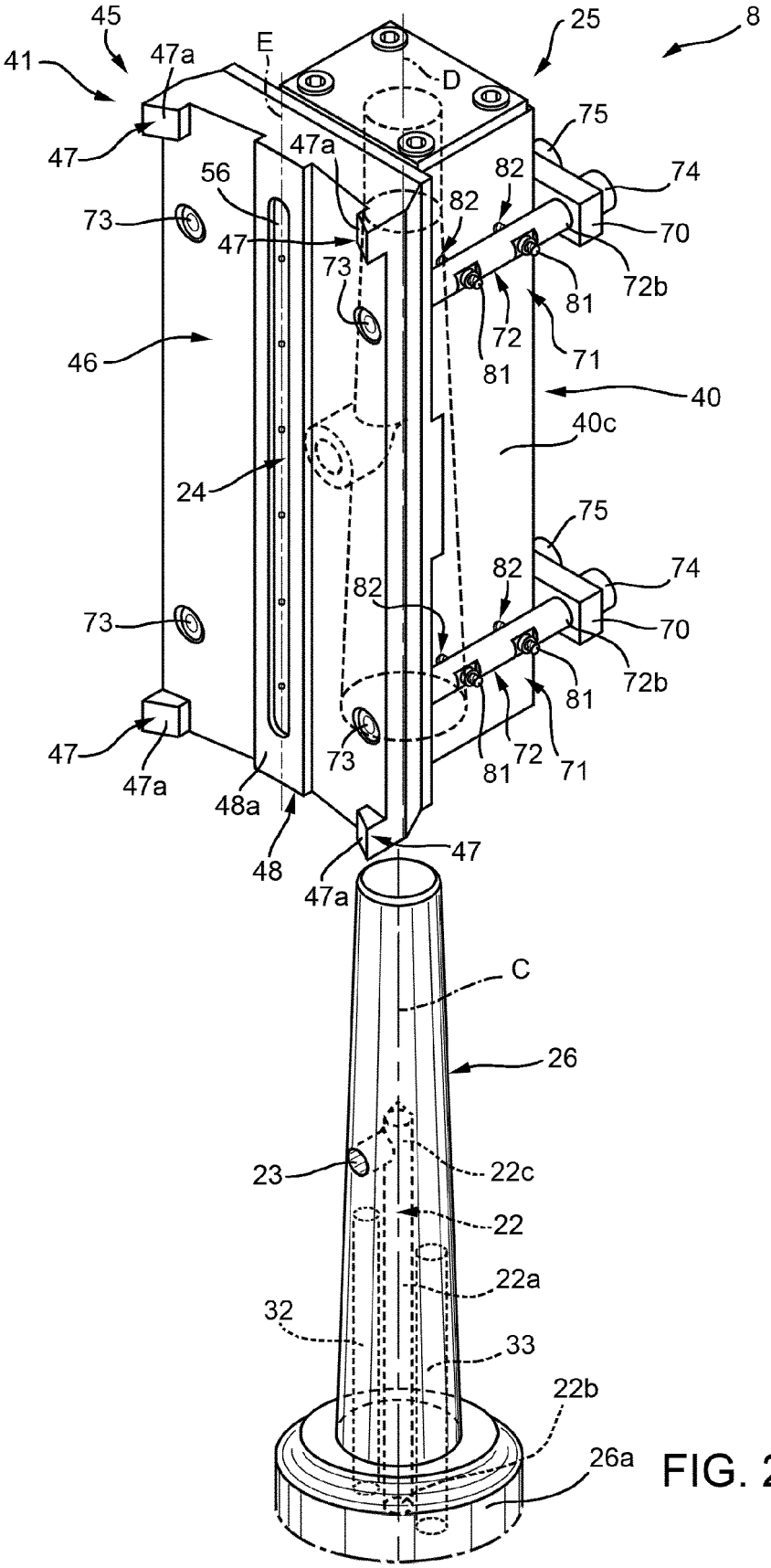

45
41
47a
E
25
8
D
75
47
47a
74
56
82
82
73
70
47
73
72b
81
72
71
81
46
40
40c
24
75
74
82
82
73
70
72b
81
47
47a
73
72
71
81
48a
48
47
47a
C
26
23
22c
22
22a
32
33
22b
26a

FIG. 2

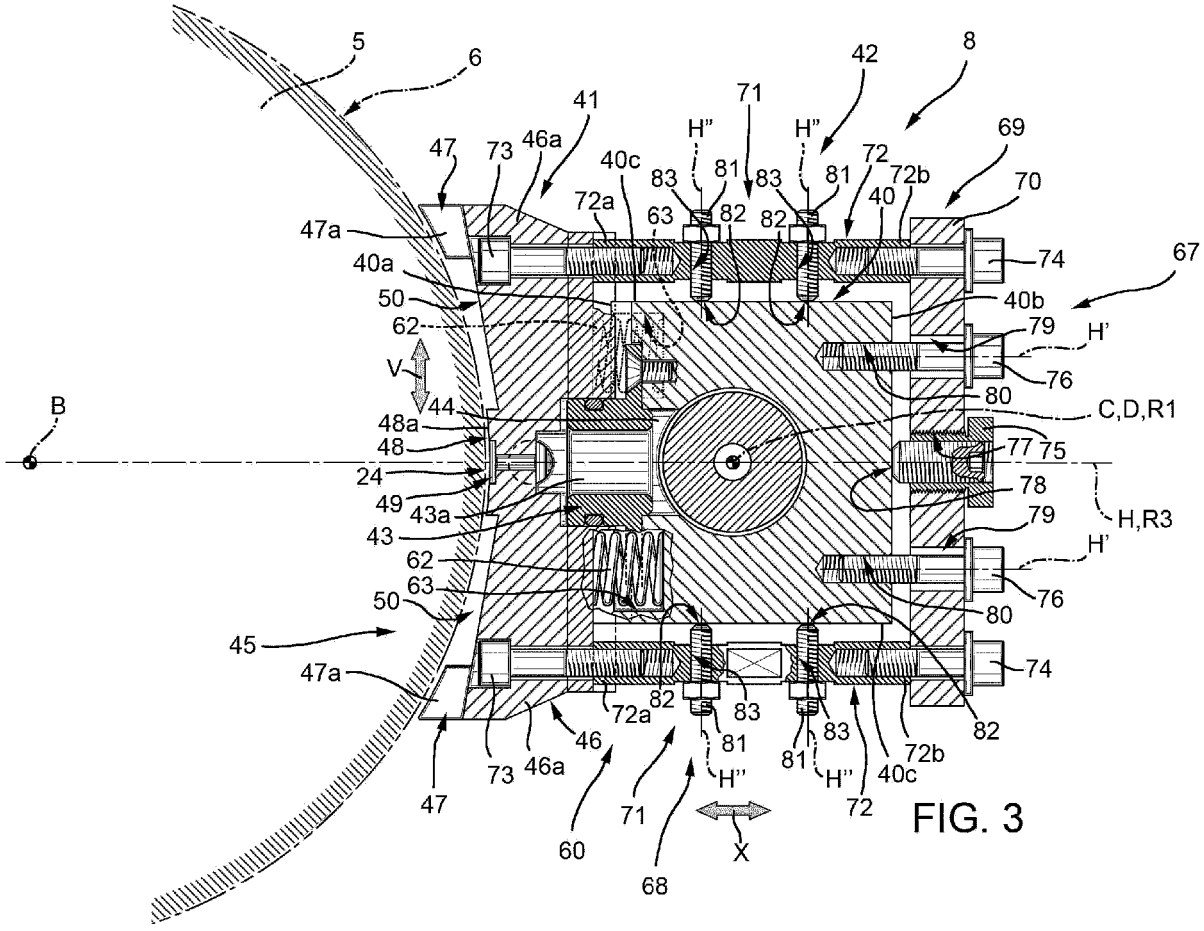

5
6
42
8
41
71
H"
H"
69
47
73
46a
40c
83
81
83
81
72
72b
70
72a
63
82
82
40
47a
74
67
40a
40b
50
62
79
H'
V
76
80
B
44
C,D,R1
48a
48
77
75
24
78
49
43a
H,R3
43
79
62
H'
63
76
50
80
45
74
47a
82
72a
83
46
81
83
82
47
73
46a
H"
81
H"
72b
40c
60
71
72
68
X

FIG. 3

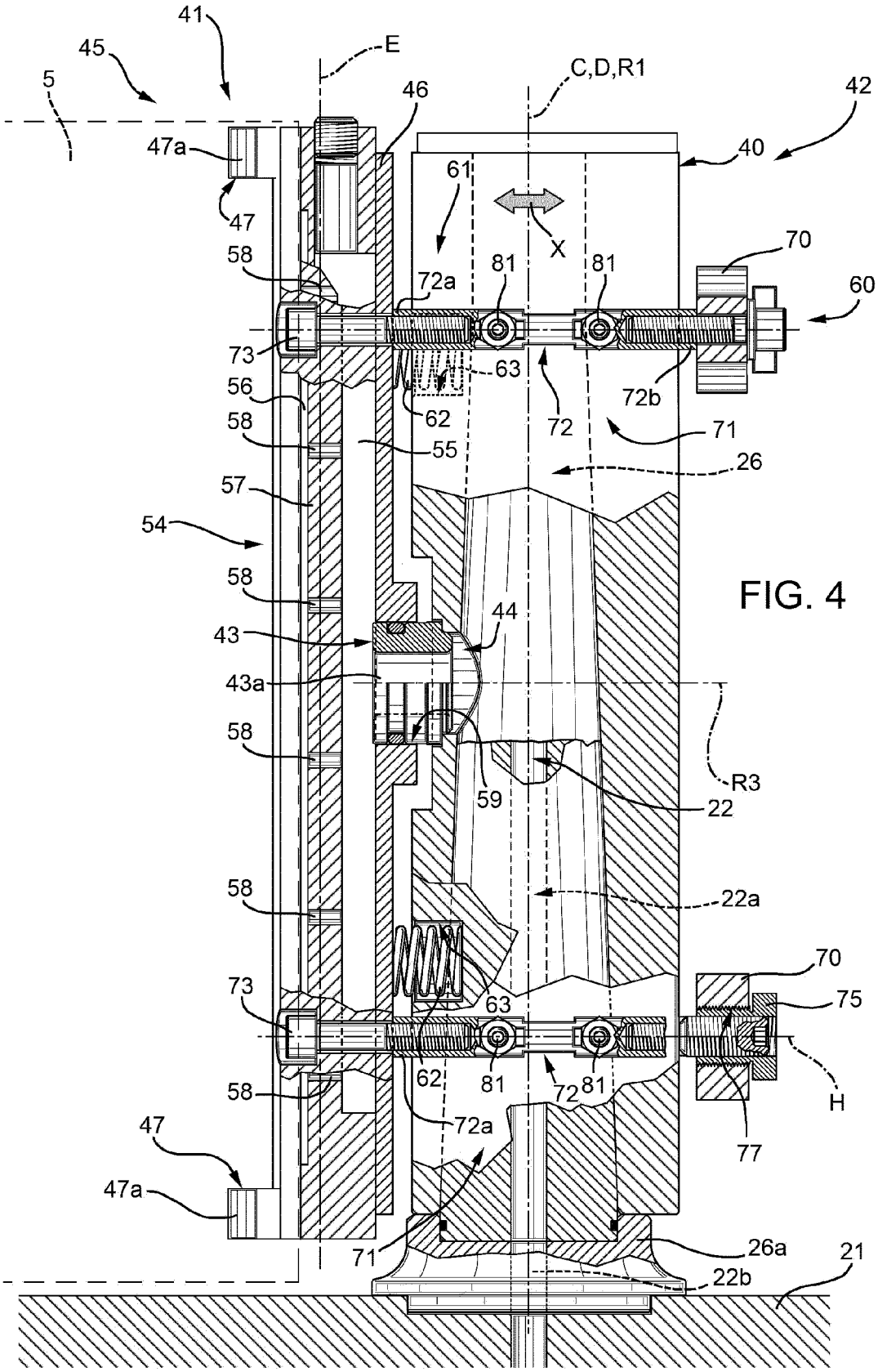

41
45
5
E
C,D,R1
46
42
47a
40
61
47
X
70
58
72a
81
81
60
73
63
56
72b
62
72
71
58
55
26
57
54
58
44
43
43a
R3
58
59
22
58
22a
70
73
63
75
62
81
72
81
H
58
72a
77
47
47a
71
26a
21
22b

FIG. 4

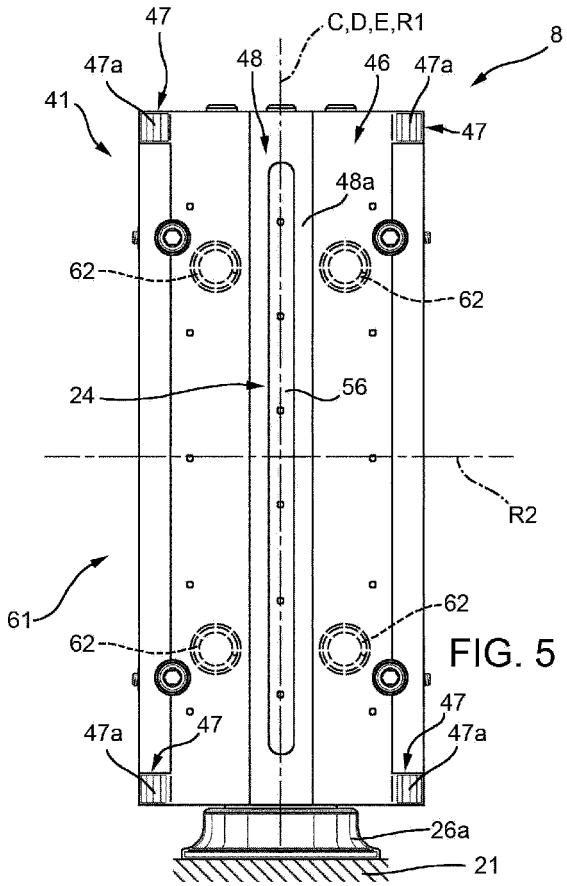

47
C,D,E,R1
8
47a
48
46
47a
41
47
48a
62
62
24
56
R2
61
62
62
47
47a
47
47a
26a
21

FIG. 5

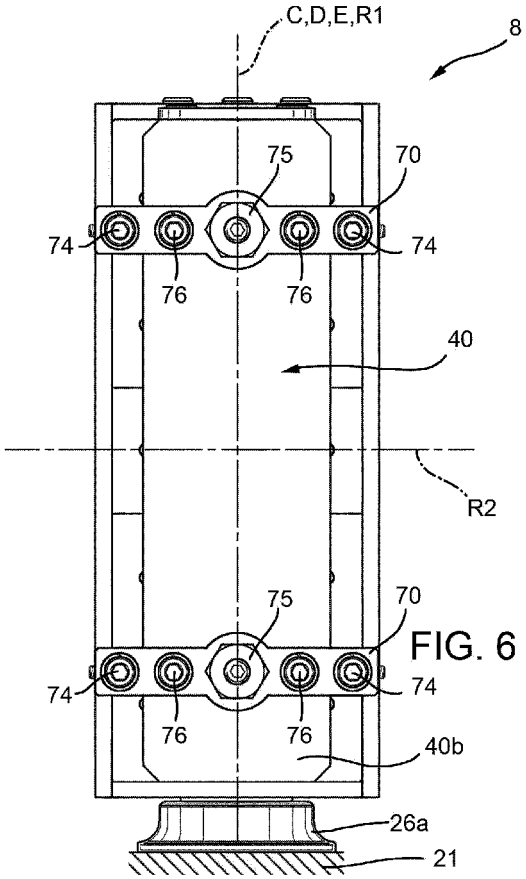

C,D,E,R1
8
75
70
74
74
76
76
40
R2
75
70
74
74
76
76
40b
26a
21

FIG. 6

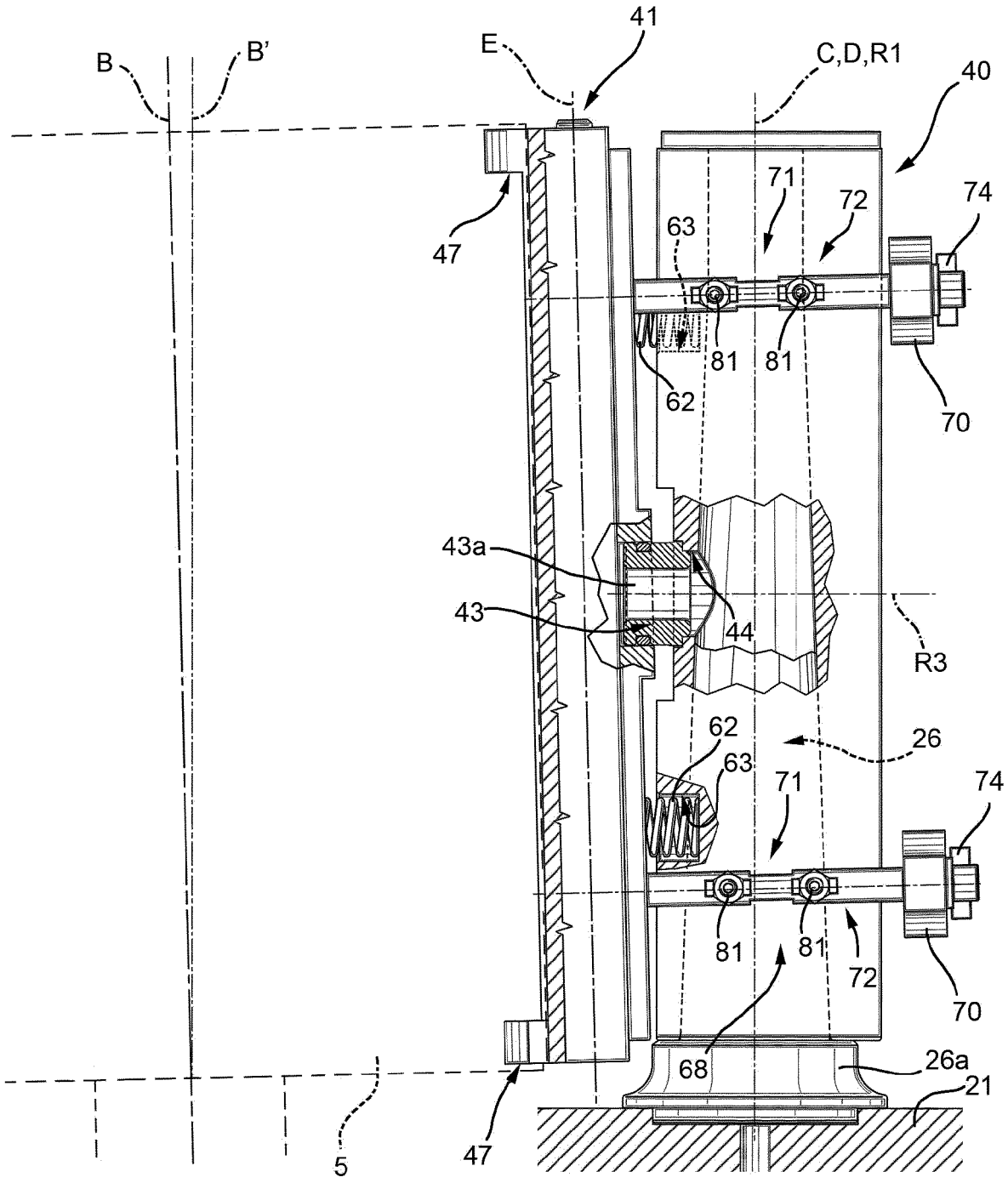

B
B'
E
41
C,D,R1
40
47
71
72
74
63
81
81
62
70
43a
43
44
R3
62
26
63
71
74
81
81
72
70
68
26a
21
47
5

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
The Hague	30 November 2016	Pardo Torre, Ignacio

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