



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.12.2016 Bulletin 2016/51

(51) Int Cl.:
B65C 9/22 (2006.01)

(21) Application number: **15173030.6**

(22) Date of filing: **19.06.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

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Remarks:

Amended claims in accordance with Rule 137(2) EPC.

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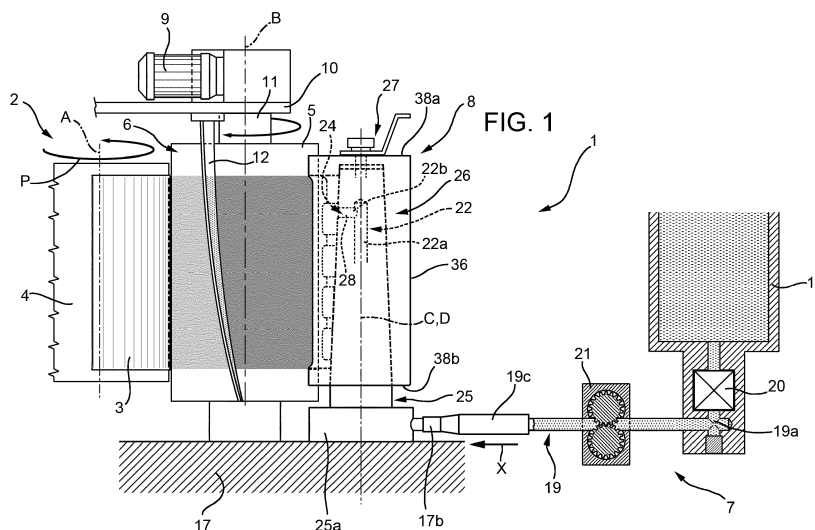
(54) **A GLUE APPLICATION UNIT FOR A LABELING APPARATUS**

(57) There is described a glue application unit (1) for a labeling apparatus (2) comprising:

- a glue roller (5) which presents a lateral outer 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);

wherein the glue distribution bar assembly (8) comprises a glue distribution bar (26), carrying the outlet section (24), and a bar support post (25) which presents the glue feeding channel (22); the glue distribution bar (26) is removably coupled onto the bar support post (25) in such a way that it at least partially covers the bar support post (25).



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 adapted 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;
- a glue feeding device adapted to continuously feed glue to glue roller and including a glue storage reservoir;
- a glue distribution bar 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] Principally, the glue used can be of hot melt type. The glue is heated in the glue feeding device in order to be maintained in its melted state, and at the temperature needed for correct efficient machine operation.

[0008] It must be further guaranteed that the glue remains in the melted state and at the correct temperature during the entire transfer from the glue storage reservoir to the back surface of each label sheet for allowing a correct fixing of such label sheet onto the respective receptacle. On the whole, this requires not only to heat the glue storage reservoir, but also to heat various other components of the glue application unit along which the glue flows, including the glue distribution bar. Thus, one or more electrically-operated (powered) heating elements are mounted to the distribution bar itself.

[0009] In practice, contaminations of the glue application unit develop during use of the glue application unit itself. These contaminations, such as label debris, are prone to be present at those parts exposed to contact with air such as the glue roller and the glue distribution bar, in particular leading to the formation of unwanted solid residues. These contaminations reduce the quality of the overall labeling process. Thus, the glue application unit needs to be regularly cleaned. In particular, cleaning of the glue distribution bar requires significant attention and time. This comes along with removing the heating elements and/or the respective (electrical) connecting means leading to extended downtimes of the labeling process and correspondingly the overall production.

DISCLOSURE OF INVENTION

[0010] It is an object of the present invention to provide a glue application unit designed to overcome, in a straightforward and low-cost manner, the aforementioned drawback.

[0011] According to the present invention, there is provided a glue application unit as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Two non-limiting embodiments 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 partially-sectioned side view of the glue distribution bar assembly of Figure 2 in an assembled configuration;

Figure 4 shows a front-side perspective view of the glue distribution bar assembly of Figure 3;

Figure 5 shows a rear-side perspective view of a

different embodiment of a glue distribution bar assembly of the glue application unit according to the present invention;

Figure 6 shows a larger-scale section along plane VI-VI of Figure 5 showing the glue distribution bar assembly cooperating with a glue roller of the glue application unit of the present invention;

Figure 7 shows a smaller-scale top plan view of the glue distribution bar assembly of Figure 6 cooperating with the glue roller;

Figure 8 shows a smaller-scale partially-sectioned side view of the glue distribution bar assembly of Figure 6 cooperating with the glue roller;

Figure 9 is analogous to Figure 7 and shows the glue distribution bar assembly in a misaligned state with respect to the glue roller;

Figure 10 is analogous to Figure 8 and shows a partially-sectioned side view of a further embodiment of a glue distribution bar assembly of the glue application unit according to the present invention, during cooperation with the glue roller;

Figure 11 shows a side view of the glue distribution bar assembly and the glue roller of Figure 10 in cooperation with one another; and

Figure 12 shows a larger-scale section along line XII-XII of Figure 10.

BEST MODE FOR CARRYING OUT THE INVENTION

[0013] 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.

[0014] 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.

[0015] 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 adjacent to glue roller 5 to selectively

spread glue in a defined manner on outer lateral surface 6 of glue roller 5.

[0016] Glue application unit 1 further comprises an electric motor 9, which rests on a support plate 10, placed above glue roller 5, and has an output shaft 11 angularly connected to a core of the glue roller 5 itself to rotate the latter about axis B.

[0017] Glue application unit 1 also comprises a glue scraper 12, 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 12 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.

[0018] 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.

[0019] Pumping means 20 can run at variable speed in accordance with varying rotation speeds of transfer drum 4.

[0020] Glue feeding device 7 presents a fixed support base structure 21 carrying on top glue roller 5 and glue distribution bar assembly 8.

[0021] 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 12 from glue roller 5 towards glue storage reservoir 18.

[0022] 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.

[0023] With reference to Figures 1 to 4, the 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 the outer surface 6 of glue roller 5.

[0024] 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.

[0025] 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.

[0026] As visible in Figures 1 to 4, the glue distribution bar assembly 8 advantageously comprises a bar support post 25 mounted on top of support base structure 21, and presenting the glue feeding channel 22 and outlet port 23. The glue distribution bar assembly 8 further comprises a glue distribution bar 26 removably coupled onto bar support post 25 and carrying outlet section 24.

[0027] In particular, bar support post 25 has a longitudinal axis C whilst glue distribution bar 26 has a longitudinal axis D, coaxially in use with axis C and extending parallel to axes A and B.

[0028] 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.

[0029] Glue distribution bar 26 partially covers bar support post 25 except a base portion 25a thereof. Glue distribution bar 26 and bar support post 25 are fastened to each other by releasable fastening means 27 (known per se and not further described).

[0030] 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 25 so as to communicate in use with outlet section 24 of glue distribution bar 25.

[0031] With reference to Figures 2 to 4, bar support post 25 further 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 25 itself. In particular, sensor element 32 is internally integrated in a position parallel to, and facing, axis C into bar support post 25.

[0032] Bar support post 25 also presents at least one heating element 33, such as a resistance heater, adapted to heat bar support post 25 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 25 in a position parallel to, and facing, axis C and spaced from sensor element 32.

[0033] 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 carried by support base structure 21.

[0034] Plus, bar support post 25 presents a truncated cone configuration tapered towards its top.

[0035] Glue distribution bar 26 presents an essentially outer parallelepiped shape and an inner configuration complementary to the truncated cone configuration of bar support post 25.

[0036] In greater details, glue distribution bar 26 has one external side facing outer lateral surface 6 of glue roller 5, having a shape substantially complementary to outer lateral surface 6 and realized as a window 34. Window 34 comprises a window frame 35 confining outlet section 24 of glue distribution bar 26 and having a shape complementary to outer surface 6 of glue roller 5. In particular, window frame 35 is adapted to contact, in use, outer surface 6 of glue roller 5.

[0037] Glue distribution bar 26 is externally bounded by a rear side 36 opposite window 34, two lateral sides 37 and a top and a bottom surface 38a, 38b transversal to longitudinal bar axis D.

[0038] The top and bottom surfaces 38a, 38b define respective axial end portions 39a, 39b of the glue distribution bar 26.

[0039] Glue distribution bar 26 further comprises a plurality of parallel transversal flanges 40 configured to increase structural stability of glue distribution bar 26. Furthermore, transversal flanges 40 divide window 34 into a plurality of parallel distribution compartments 41a, 41b, 41c, 41d with distribution compartment 41a being disposed in the uppermost position. Outlet port 23 of glue feeding channel 22 is in fluidic communication with said uppermost distribution compartment 41a. It is pointed out that glue distribution bar 26 does not contact, in use, outer surface 6 of glue roller 5 at flanges 40 in such a way that communication through distribution compartments 41a, 41b, 41c, 41d occurs along the outer sides of flanges 40.

[0040] Glue distribution bar 26 further comprises glue overflow outlet means 42 configured to guide, in use, glue in excess out of glue distribution bar 26. Glue overflow outlet means 42 are preferably interposed between top surface 38a and uppermost distribution compartment 41a and comprise an elongated overflow channel 43 transversally integrated into glue distribution bar 26 in the proximity of top surface 38a and at least one overflow outlet 44 disposed on one respective lateral side 37 of glue distribution bar 26. The glue overflow enables the glue bar to maintain ambient pressure or pump pressure.

[0041] Figures 1 and 2 further indicate in detail that bar support post 25 is arranged on top of support base structure 21 in an adjustable position. Adjusting means 45 are configured to displace bar support post 25 on support base structure 21 to or away from glue roller 5. Accordingly, adjusting means 45 are adapted to align glue distribution bar assembly 8 and in particular outlet section 24 with respect to glue roller 5, i.e. to place the glue distribution bar assembly 8 in the desired position to supply glue to the glue roller 5.

[0042] With particular reference to Figure 2, adjusting means 45 comprise first engagement means 47 carried by support base structure 21 and second engagement means 48 carried by base portion 25a of bar support post

25 and coupled in a slideable manner to first engagement means 47 along a horizontal direction X orthogonal to axes A, B, C and D.

[0043] Adjusting means 45 further comprise an adjustment screw 46 configured to impart a movement on bar support post 25 to or away from glue roller 5 along direction X and mechanical fixing means 49 adapted to fix the bar support post 25 to the support base structure 21 in the desired position along direction X.

[0044] In the specific example, first engagement means 47 present two parallel rectilinear guiding grooves 47a, 47b carved into support base structure 21 and second engagement means 48 comprise two parallel rectilinear ribs 48a, 48b protruding from base portion 25a and being housed in a slideable manner inside the respective rectilinear guiding grooves 47a, 47b.

[0045] Furthermore, the diameter of terminal conduit portion 19a of glue feeding conduit 19 is larger than the diameter of glue feeding channel 19, or more particularly of lower end 22c so as to guarantee fluid connection between glue storage reservoir 18 and outlet port 23 independently of the exact position of bar support post 25 on support base structure 21, therewith, compensating for any displacements of bar support post 25. Additionally, the electrical connecting means of sensor element 32 and heating element 33 are connected in a flexible manner in order to compensate for displacement of bar support post 25, too (not shown and known as such).

[0046] 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 so as to establish contact of window frame 35 with outer lateral surface 6 of glue roller 5 by actuating adjusting means 45 on bar support post 25 and by finally fixing bar support post 25 to the support base structure 21 itself through mechanical fixing means 49.

[0047] After completing positioning of glue distribution bar assembly 8, 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 26. In particular, glue exits from outlet port 23 and first enters uppermost distribution compartment 41a of window 34 of glue distribution bar 26. Further supply of glue leads to a subsequent filling of distribution compartments 41b, 41c, 41d due to gravitational action on the glue itself. Finally, a veil of glue is established between outer lateral surface 6 of glue roller 5 and outlet section 24 of glue distribution bar 26 and glue is transferred on the rotating glue roller 5. Furthermore, glue in excess is laterally guided out of glue distribution bar 26 through overflow channel 43 and overflow outlet 44. During further rotation of glue roller 5, glue in excess is eventually removed by glue scraper 12. 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.

[0048] In Figures 5 to 9 number 8' indicates as a whole an alternative embodiment of a glue distribution bar assembly being part of a glue application unit 1 according to the present invention. In this particular embodiment, bar support post 25 is fixedly connected to support base structure 21 and, with a few exceptions, the other features are the same or equivalent to those already described.

[0049] In this embodiment, adjusting means 45 are not present.

[0050] Furthermore, in this embodiment, the diameter of terminal conduit portion 19a of glue feeding conduit 19 is not required to be chosen so as to compensate for displacement of bar support post 25. Thus, the diameter of terminal conduit portion 19a can be chosen to have proportions similar to what is described with respect to the embodiment of Figures 1 to 4 or can be equal to the common diameter of glue feeding conduit 19.

[0051] Another subtle difference concerns that glue distribution bar assembly 8' comprises a glue distribution bar 26', which differs from glue distribution bar 26 in that axial end portions 39'a, 39'b protrude towards outer lateral surface 6 of glue roller 4.

[0052] For reasons of conciseness, we use, further on, the same numerals as above and we refer in the description solely to the additional features of the embodiment of Figures 5 to 9.

[0053] With reference to Figures 5 to 7, glue distribution bar assembly 8' further comprises:

- a pair of side plates 50 laterally mounted to glue distribution bar 26' in a displaceable manner to and away from the outer lateral surface 6 of glue roller 5 along a horizontal direction Y, which is parallel to support base structure 21 and orthogonal to axes A, B, C and D; and
- a lower and an upper elastically compressible element, in the example shown sponge elements 51a, 51b, extending orthogonally to axes C, D and between the side plates 50 as well as cooperating with respective axial end portions 39'a, 39'b.

[0054] Side plates 50 and sponge elements 51a, 51b are adapted to compensate any misalignment of the glue distribution bar assembly 8' with respect to glue roller 5.

[0055] In particular, each side plate 50 is mounted to one respective lateral side 37 of glue distribution bar 26'. Furthermore, each side plate 50 comprises a main plate portion 50a, oriented parallel to, and in contact with, a corresponding lateral side 37, and a transversal portion 50b orthogonal to main plate portion 50a and protruding from the latter. Each main plate portion 50a presents an extension section 50c protruding with respect to window 34 of glue distribution bar 26' towards outer lateral surface 6 of glue roller 5 in a direction parallel to direction Y.

[0056] As visible in Figure 5 to 7 and 9, transversal portion 50b extends from one end of main plate portion 50a opposite extension section 50c. In this way, each side plate 50 has a L-shaped cross-section.

[0057] With particular reference to Figures 6, 7 and 9, each side plate 50 is laterally fixed to the respective lateral side 37 of glue distribution bar 26' with play in a direction parallel to direction Y. In particular, fixing of each side plate 50 to glue distribution bar 26 is performed through a relative screw element 52, which engages a slot 53 formed in main portion 50a and a screw anchor block seat 54 formed in glue distribution bar 26' itself.

[0058] Furthermore, glue distribution bar assembly 8' comprises displacement means 58 adapted to displace the side plates 50 to or away from outer lateral surface 6 of glue roller 5 parallel to direction Y.

[0059] With particular reference to Figures 5 and 6, displacement means 58 comprise, for each side plate 50, one or more screw assemblies 59, two in the example shown, each of which has a relative axis E parallel to direction Y and is adapted to impart to the relative side plate 50 a linear movement parallel to the direction Y itself.

[0060] Displacement means 58 further comprise one or more transversal bars 59, two in the example shown, secured to glue distribution bar 26' orthogonally to axes D and E and adapted to support the one or more screw assemblies 59. More specifically, each screw assembly 59 is fixedly mounted to respective side plate 50 and is moveable mounted to transversal bar 60 with respect to its axis E. In more detail, each screw assembly 59 is fixedly attached to transversal portion 50b of respective side plate 50.

[0061] Furthermore, transversal bar 60 is partially hosted in a respective transversal recess 61 carved into posterior side 36 of glue distribution bar 26 and projects from the opposite lateral sides 37 of glue distribution bar 26' with respective terminal portions 60a. As shown in Figures 5 to 7 and 9, each terminal portion 60a faces the transversal portion 50b of the respective side plate 50.

[0062] In more detail, each screw assembly 59 comprises:

- a nut-screw connecting member 62 interposed between transversal portion 50b of respective side plate 50 and transversal bar 60;
- a screw member 63 adapted to connect one end portion 62a of nut-screw connecting member 62 to respective transversal portion 50b; and
- a screwing unit 64 fixed to one opposite end portion 62b of nut-screw connecting member 62 and cooperating with one respective terminal portion 60a of the relative transversal bar 60.

[0063] Furthermore, screwing unit 64 presents an actuation screw member 65 screwed into a threaded hole 66 of the respective terminal portion 60a, and a locking screw member 67 fixing the actuation screw member 65 fixed to nut-screw connecting member 62. Locking screw member 67 engages an axial through-hole 68 of the actuation screw member 65 and is screwed into nut-screw connecting member 62. Additionally, screwing unit 64

comprises a spring element 69 interposed between nut-screw connecting member 62 and actuation screw member 65.

[0064] With reference to Figures 7 to 9, each axial end portion 39a, 39b presents a sponge housing recess 70a, 70b carved into axial end portions 39'a, 39'b and adapted to partially host one respective of upper and lower sponge elements 51a, 51b.

[0065] Overall, side plates 50 and sponge elements 51a, 51b define a transferring space 71 through which glue is transferred to the outer lateral surface 6 of the glue roller 5.

[0066] In use, rotation of one actuation screw member 65 around its axis E imparts a linear movement parallel to direction Y onto respective nut-screw connecting member 62 which transfers the linear movement to respective transversal portion 50b of respective side plate 50 and correspondingly to the side plate 50 itself.

[0067] With reference to Figures 8 and 9, side plates 50 and sponge elements 51a, 51b are adapted to compensate for possible misalignments of glue distribution bar 26' with respect to outer lateral surface 6 of glue roller 5.

[0068] Figure 8 illustrates a simple misalignment in which axis D of glue distribution bar 26' deviates from an ideal axis D' of glue distribution bar 26' at which glue distribution bar 26' is placed in the correct position with respect to glue roller 5, i.e. ideal axis D' is parallel to axis B of glue distribution bar 26'. In the case of a simple misalignment, axis D presents an inclination with respect to ideal axis D' and axis B of glue roller 5. This simple misalignment is compensated by imparting different linear motions along axes E of the screw assemblies 59 to different portions of each side plate 50 so as to get the side plate 50 itself into contact with the outer lateral surface 6 of glue bar 5. At the same time, sponge elements 51a, 51b are differently compressed between axial end portions 39'a, 39'b of the glue distribution bar 26' and the glue roller 5. In this way, transferring space 71 is correctly sealed around its perimeter between glue distribution bar 26 and the glue roller 5.

[0069] Figure 9 shows a complex misalignment, for example a tangential angular misalignment between the post and the roller, in which axis D of glue distribution bar 26' is disposed around the ideal axis D' of glue distribution bar 26'. This complex misalignment is compensated by imparting different linear displacements to side plates 50 along direction Y to or away from outer lateral surface 6 so that side plates 50 contact outer lateral surface 6. Additionally, each sponge element 51a, 51b is compressed stronger in the proximity of one of lateral sides 37 of glue distribution bar 26' than in the vicinity of the other one of lateral sides 37.

[0070] Thus, in practice, prior to use of glue application unit 1, in the embodiment of Figures 5 to 9, glue distribution bar 26' together with sponge elements 51a,b is coupled to and fixed on bar support post 25. Then, side plates 50 are selectively positioned with respect to outer

lateral surface 6 of glue roller 5.

[0071] Furthermore, the operation of glue distribution bar assembly 8' shown in Figures 5 to 9 is identical to the one shown in Figures 1 to 4 and previously described.

[0072] With reference to Figures 10 to 12, number 8" indicates as a whole a further embodiment of a glue distribution bar assembly being part of glue application unit 1 according to the present invention; as glue distribution bar assembly 8" is similar to glue distribution bar assembly 8', the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0073] In particular, glue distribution bar assembly 8" differs from glue distribution bar assembly 8' basically by including a differently-configured glue distribution bar 26" and by the fact that side plates 50 and sponge elements 51a, 51b are replaced by:

- a contact frame 75 having an interaction portion 76 interposed between glue roller 5 and glue distribution bar 26" and coupled to the glue distribution bar 26" itself in an adjustable position to and away from the outer lateral surface 6 along a horizontal direction Z parallel to support base structure 21 and orthogonal to axes A, B, C and D; and
- an elastically compressible delimiting element, in particular a sponge element 77, interposed between glue distribution bar 26" and contact frame 75.

[0074] In particular, interaction portion 76 of contact frame 75 is configured to contact, on one side, the outer lateral surface 6 of glue roller 5 and to cooperate, on the opposite side, with glue distribution bar 26" through the interposition of sponge element 77; in this way, interaction portion 76 of contact frame 75 delimits a transferring space 71", through which melted glue is transferred from glue distribution bar 26" to glue roller 5.

[0075] In greater details, in this case, glue distribution bar 26" slightly differs from the corresponding glue distribution bar 26' by presenting an elongated glue outlet opening 78 facing outer lateral surface 6 of glue roller 5 and connected to outlet port 23 of glue feeding channel 22.

[0076] Furthermore, axial end portions 39"a, 39"b of glue distribution bar 26" partially protrude towards outer lateral surface 6 and are configured to delimit the longitudinal extension of elongated glue outlet opening 78.

[0077] Contact frame 75 further presents a substantially L-shaped section (Figure 12) and has:

- a main contact frame portion 79 substantially parallel to axis C and D and to rear side 36 of glue distribution bar 26" and carrying interaction portion 76; and
- a fixing portion 80 extending perpendicular from one end section 79a of main contact frame portion 79 and away from outer lateral surface 6 of glue roller 5 and being oriented parallel to lateral sides 37 of glue distribution bar 26" and in contact with one rel-

ative lateral side 37.

[0078] Contact frame 75 also presents a protruding portion 81 configured to increase, in use, stability of contact between glue distribution bar 26" and the contact frame 75 itself. Protruding portion 81 extends perpendicular from an end section 79b of main contact frame portion 79 opposite end section 79a and protruding away from outer lateral surface 6 of glue roller 5; protruding portion 81 is oriented parallel to lateral sides 37 of glue distribution bar 26" and in contact with the lateral side 37 opposite the one contacted by fixing portion 80.

[0079] Furthermore, interaction portion 76 presents a shape complementary to outer lateral surface 6 of glue roller 5 and protrudes from main contact frame portion 79 towards the outer lateral surface 6 itself.

[0080] Additionally, main contact frame portion 75 comprises a plurality of through-ports 82 adapted to establish a fluid connection between transferring space 71" and elongated glue outlet opening 78 and, consequently, to establish a fluid connection between transferring space 71" and outlet port 23 of glue feeding channel 22.

[0081] With particular reference to Figure 12, contact frame 75 and in particular fixing portion 80 are secured to glue distribution bar 26" with play in a direction parallel to direction Z. In particular, securing fixing portion 80 to glue distribution bar 26" is realized in a similar way as side plates 50 are fixed to glue distribution bar 26'.

[0082] More specifically, fixing portion 80 of contact frame 75 is secured to glue distribution bar 26" through one or more screw elements 52", in the particular example two, each of which engages a respective slot 53" formed in fixing portion 80 and a respective threaded hole 54" formed in glue distribution bar 26" itself.

[0083] Additionally, distribution bar assembly 8" comprises displacement means 58", similar to displacement means 58, adapted to impart a linear movement along direction Z to contact frame 75 so as to bring interaction portion 76 into contact with outer lateral surface 6 of glue roller 5.

[0084] Displacement means 58" comprise one or more displacement screw members 88, two in the example shown, each of which has a relative axis E" parallel to direction Z and is adapted to impart a linear movement parallel to the direction Z itself.

[0085] Displacement means 58" further comprises one or more transversal bars 60", two in the example shown, secured to glue distribution bar 26" orthogonally to axes D and E" and adapted to support the one or more displacement screw members 88. More specifically, each displacement screw member 88 is fixedly mounted to fixing portion 80 and is moveable mounted to one respective of transversal bars 60" with respect to its axis E".

[0086] Furthermore, transversal bar 60" is partially hosted in a respective transversal recess 61" carved into rear side 36 of glue distribution bar 26". Furthermore, transversal bar 60" is secured to glue distribution bar

26" by respective securing screw members 89. Additionally, transversal bar 60" projects from the one lateral side 37 of glue distribution bar 26 which is in contact with fixing portion 80 through a terminal portion 60a".

[0087] In more detail, each displacement screw member 88 is adapted to connect, at one end, to fixing portion 80 and to cooperate, at the opposite end, with terminal portion 60a" of respective transversal bar 60". In particular, the end of displacement screw member 88 cooperating with respective terminal portion 60a" is screwed into a respective threaded hole 66" of terminal portion 60a" itself. In such a way, rotation of displacement screw member 88 leads to a translation parallel to axis Z and, accordingly, to displacement of contact frame 75 parallel to direction Z and to or away from outer lateral surface 6 of glue roller 5.

[0088] In addition, sponge element 77 is disposed around glue outlet opening 78 in such a way that the fluid connections between glue outlet opening 78 and through-ports 82 are not blocked by the sponge element 77 itself.

[0089] Overall, the function of glue distribution assembly 8" is similar to the function of glue distribution assembly 8'. In practice, prior to use of glue application unit 1, delimiting element 77 and contact frame 75 are mounted to glue distribution bar 26". Then glue distribution bar 26" is coupled and fastened to bar support post 25. Further on, contact frame 75 is moved by displacement means 58" to or away from outer lateral surface 6 of glue roller 5 in order to bring interaction portion 76 of contact frame 75 into contact with the outer lateral surface 6 itself.

[0090] Any possible simple or complex misalignment as described with respect to glue distribution assembly 8' are compensated by cooperation of contact frame 75 with sponge element 77. In the ideal case of no misalignment, sponge element 77 is equally compressed along its perimeter. In the case of a simple or complex misalignment, sponge element 77 presents portions along its perimeter which are stronger compressed than others, thereby guaranteeing that interaction portion 76 of contact frame 75 correctly contacts outer lateral surface 6 of glue roller 5. Accordingly, transferring space 71" is correctly sealed.

[0091] After alignment of glue distribution assembly 8", glue application unit 1 can be put into operation. For reasons of conciseness, we limit the description of operation of the embodiment of Figures 10 to 12 to the differences with respect to the embodiments of Figures 1 to 4 and Figures 5 to 9. In particular, glue is pumped from glue storage reservoir 18 through glue feeding conduit 19 to glue feeding channel 22. Then, glue exits from outlet port 23 into glue outlet opening 78 from where glue is transferred through through-ports 82 into transferring space 71".

[0092] The advantages of glue application unit 1 according to the present invention will be clear from the foregoing description.

[0093] In particular, in order to proceed to a cleaning

step of the glue distribution bar assembly 8, solely fastening means 27 need to be loosened and the respective glue distribution bar 26, which normally contains the solid residues and contaminations of glue, is simply removed from bar support post 25 and subjected to a thorough cleaning.

[0094] Sensor element 32 and heating element 33 needed to guarantee maintenance of the desired temperature so that glue remains in the melted state, are incorporated into bar support post 25 and do not need to be disconnected. The same holds true for the glue feeding channel 22.

[0095] Additionally, maintenance of the desired temperature is guaranteed due to the rather large mass defined by the bar support post 25 and the coupling of glue distribution bar 26, 26', 26" to bar support post 25 as well as the incorporation of sensor element 32 and heating element 33 into the bar support post 25.

[0096] In the case of glue distribution bar assemblies 8', 8", removal of the respective glue distribution bars 26', 26" may require simultaneous removal of side plates 50 or contact frame 75.

[0097] Overall, glue application unit 1 of the present invention comes along with a fast and easy dismounting step of the respective glue distribution bar 26, 26', 26" and immediately after, such glue distribution bar 26, 26', 26", and eventually side plates 50 or contact frame 75, can be thoroughly and easily cleaned. Overall cleaning of glue application unit 1 is therefore facilitated with respect to what is described in the state-of-the-art.

[0098] Additionally, the truncated cone configuration of bar support post 25 and the complementary inner shape of glue distribution bar 26, 26', 26" allow for precise and consistent relocation of the glue distribution bar assembly 8, 8', 8" after the cleaning process itself.

[0099] Furthermore, the positioning of glue distribution bar assembly 8 with respect to glue roller 5 is easily achieved by adjusting means 45 in the embodiment of Figures 1 to 4, in which glue distribution assembly 8 is moveably fixed on support base structure 21.

[0100] Plus, the use of side plates 50 and sponge elements 51a, 51b, as described in the embodiment of Figures 5 to 9, offers a facilitated manner to correctly seal transferring space 71 around the perimeter between the glue distribution bar 26 and the glue roller 5, also in the case of possible misalignments of the glue distribution bar 26 with respect to glue roller 5 itself.

[0101] Similarly, correct sealing of transferring space 71" is guaranteed also for glue distribution bar assembly 8". The cooperation of interaction portion 76 of contact frame 75 and sponge element 77 with glue distribution bar 26" and outer lateral surface 6 of glue roller 5 permits the correct sealing of transferring space 71" also in the case of possible misalignments.

[0102] 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.

[0103] 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 one respective compartment 41a, 41b, 41c, 41d.

[0104] In another possible embodiment not shown, glue distribution bar 26 or 26' may not require flanges 40 and consequently only one distribution compartment would be defined.

[0105] It must be further understood that, alternatively to the embodiments shown in Figures 1 to 12, glue distribution bar 26, 26' or 26'' may be configured to fully cover bar support post 25.

[0106] In the embodiment shown in Figures 5 to 9, bar support post 25 is fixedly connected to support base structure 21. The use of side plates 50 as illustrated in the above description is not limited to this embodiment. In particular, side plates 50 as described above and the respective displacement means 58 are applicable also to the embodiment as illustrated in Figures 1 to 4 or Figures 10 to 12. In the latter case side plates 50 would substitute contact frame 75.

[0107] In an even other embodiment not shown, contact frame 75 could be applied to glue distribution assembly 8 or glue distribution assembly 8', in the latter case substituting side plates 50.

Claims

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

- a glue roller (5) which presents a lateral outer 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, 8', 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, 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, 8', 8'') comprises a glue distribution bar (26, 26', 26''), carrying the outlet section (24, 24''), and a bar support post (25) which presents the glue feeding channel (22); the glue distribution bar (26, 26', 26'') being removably coupled onto the bar support post (25) in such a way that it at least partially covers the bar support post (25).

2. The unit (1) according to claim 1, wherein the bar support post (25) comprises at least one sensor el-

ement (32) configured to measure the temperature of the bar support post (25) itself.

3. The unit (1) according to claim 1 or 2, wherein the bar support post (25) comprises at least one heating element (33) adapted to heat the glue flowing through the glue feeding channel (22).
4. The unit (1) according to any one of the preceding claims, further comprising a fixed support base structure (17) carrying on top the bar support post (25) in an adjustable position and comprising adjusting means (45) selectively cooperating with the bar support post (25) to displace the outlet section (24) of the glue distribution bar (26) to or from the glue roller (5).
5. The unit (1) according to claim 4, wherein the adjusting means (45) comprises first engagement means (47) carried by support base structure (17), second engagement means (48) carried by the bar support post (25) and coupled in a slideable manner to the first engagement means (47), and mechanical fixing means (49) adapted to fix the bar support post (25) in a given position onto the support base structure (17).
6. The unit (1) according to claim 5, wherein the first engagement means (47) comprise at least one rectilinear guiding groove (47a, 47b) carved into the support base structure (17); wherein the second engagement means (48) comprise at least one rectilinear rib (48a, 48b) projecting from the bar support post (25); and wherein the at least one rectilinear rib (48a, 48b) is coupled in a slideable manner into the at least one rectilinear guiding groove (47a, 48b).
7. The unit (1) according to any one of the preceding claims, wherein the glue distribution bar assembly (8') comprises:
 - a pair of side plates (50) laterally mounted to the glue distribution bar (26'') in a displaceable manner to and away from the outer lateral surface (6) of the glue roller (5);
 - a pair of elastically compressible elements (51a, 51b), in particular sponge elements, extending transversally to a glue distribution bar axis (D) and between the pair of side plates (50); wherein the elastically compressible elements (51a, 51b) cooperate with respective opposite axial end portions (39a, 39b) of the glue distribution bar (26'') and with respective portions of the outer lateral surface (6) of the glue roller (5); and
 wherein the pair of side plates (50) and the pair of elastically compressible elements (51a, 51b) define a transferring space (71) through which

glue is transferred from the outlet section (24) to the outer lateral surface (6) of the glue roller (5).

8. The unit (1) according to claim 7, wherein the glue distribution bar assembly (8') comprises displacement means (58) selectively cooperating with the pair of side plates (50) to displace the side plates (50) to or away from the outer lateral surface (6) of the glue roller (5). 5
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9. The unit (1) according to claim 8, wherein the displacement means (58) are selectively activated to displace each single one of the pair of side plates (50) to or away from the outer lateral surface (6) of the glue roller (5). 15
10. The unit according to any one of claims 1 to 6, wherein the glue distribution bar assembly (8'') further comprises: 20
 - a contact frame (75) having an interaction portion (76) interposed between the glue roller (5) and the glue distribution bar (26'') and coupled to the glue distribution bar (26'') itself in an adjustable position to and away from the outer lateral surface (6) of the glue roller (5); and 25
 - a compressible delimiting element (77) interposed between the glue distribution bar (26'') and the contact frame (75); 30
 - wherein the interaction portion (76) is adapted to delimit a transferring space (71'') through which glue is transferred from the outlet section (24'') to the outer lateral surface (6) of the glue roller (5). 35
11. The unit according to claim 10, wherein the interaction portion (76) of the contact frame (75) is configured to contact, on one side, the outer lateral surface (6) of the glue roller (5) and to cooperate, on the opposite side thereof, with the glue distribution bar (26'') through the interposition of the compressible delimiting element (77). 40
12. The unit according to claim 10 or 11, wherein the glue distribution bar assembly (8'') comprises displacement means (58'') cooperating with the contact frame (75) to displace the interaction portion (76) of the contact frame (75) itself to or away from the outer lateral surface (6) of the glue roller (5). 45
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13. The unit according to any one of the preceding claims, wherein the bar support post (25) has a truncated cone configuration, and wherein the glue distribution bar (26, 26', 26'') has an internal shape complementary to that of the bar support post (25). 55

Amended claims in accordance with Rule 137(2) EPC.

1. Glue application unit (1) for a labeling apparatus (2) comprising: 5
 - a glue roller (5) which presents a lateral outer 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, 8', 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, 24''), adapted to selectively transfer the glue from the glue feeding channel (22) to the glue roller (5); 10
- the glue distribution bar assembly (8, 8', 8'') comprises a glue distribution bar (26, 26', 26''), carrying the outlet section (24, 24''), and a bar support post (25); the glue distribution bar (26, 26', 26'') being removably coupled onto the bar support post (25) in such a way that it at least partially covers the bar support post (25); 20

characterized in that the bar support post (25) presents the glue feeding channel (22). 25
2. The unit (1) according to claim 1, wherein the bar support post (25) comprises at least one sensor element (32) configured to measure the temperature of the bar support post (25) itself. 30
3. The unit (1) according to claim 1 or 2, wherein the bar support post (25) comprises at least one heating element (33) adapted to heat the glue flowing through the glue feeding channel (22). 35
4. The unit (1) according to any one of the preceding claims, further comprising a fixed support base structure (21) carrying on top the bar support post (25) in an adjustable position and comprising adjusting means (45) selectively cooperating with the bar support post (25) to displace the outlet section (24) of the glue distribution bar (26) to or from the glue roller (5). 40
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5. The unit (1) according to claim 4, wherein the adjusting means (45) comprises first engagement means (47) carried by support base structure (17), second engagement means (48) carried by the bar support post (25) and coupled in a slideable manner to the first engagement means (47), and mechanical fixing means (49) adapted to fix the bar support post (25) in a given position onto the support base structure (17). 50
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6. The unit (1) according to claim 5, wherein the first engagement means (47) comprise at least one rectilinear guiding groove (47a, 47b) carved into the support base structure (17); wherein the second engagement means (48) comprise at least one rectilinear rib (48a, 48b) projecting from the bar support post (25); and wherein the at least one rectilinear rib (48a, 48b) is coupled in a slideable manner into the at least one rectilinear guiding groove (47a, 48b).

7. The unit (1) according to any one of the preceding claims, wherein the glue distribution bar assembly (8') comprises:

- a pair of side plates (50) laterally mounted to the glue distribution bar (26') in a displaceable manner to and away from the outer lateral surface (6) of the glue roller (5);
- a pair of elastically compressible elements (51a, 51b), in particular sponge elements, extending transversally to a glue distribution bar axis (D) and between the pair of side plates (50);

wherein the elastically compressible elements (51a, 51b) cooperate with respective opposite axial end portions (39a, 39b) of the glue distribution bar (26') and with respective portions of the outer lateral surface (6) of the glue roller (5); and

wherein the pair of side plates (50) and the pair of elastically compressible elements (51a, 51b) define a transferring space (71) through which glue is transferred from the outlet section (24) to the outer lateral surface (6) of the glue roller (5).

8. The unit (1) according to claim 7, wherein the glue distribution bar assembly (8') comprises displacement means (58) selectively cooperating with the pair of side plates (50) to displace the side plates (50) to or away from the outer lateral surface (6) of the glue roller (5).

9. The unit (1) according to claim 8, wherein the displacement means (58) are selectively activated to displace each single one of the pair of side plates (50) to or away from the outer lateral surface (6) of the glue roller (5).

10. The unit according to any one of claims 1 to 6, wherein the glue distribution bar assembly (8'') further comprises:

- a contact frame (75) having an interaction portion (76) interposed between the glue roller (5) and the glue distribution bar (26'') and coupled to the glue distribution bar (26'') itself in an adjustable position to and away from the outer lateral surface (6) of the glue roller (5); and
- a compressible delimiting element (77) inter-

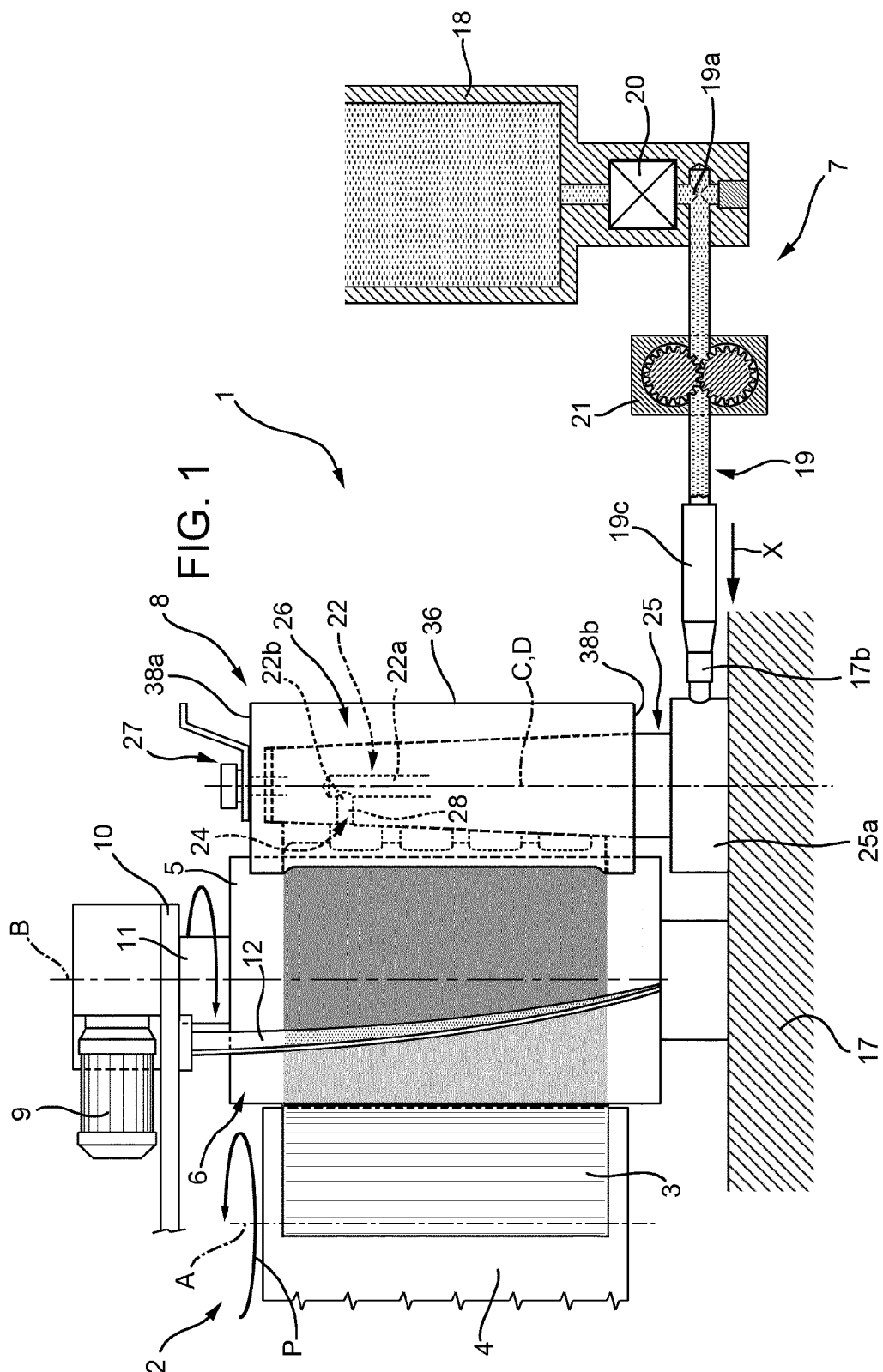
posed between the glue distribution bar (26'') and the contact frame (75);

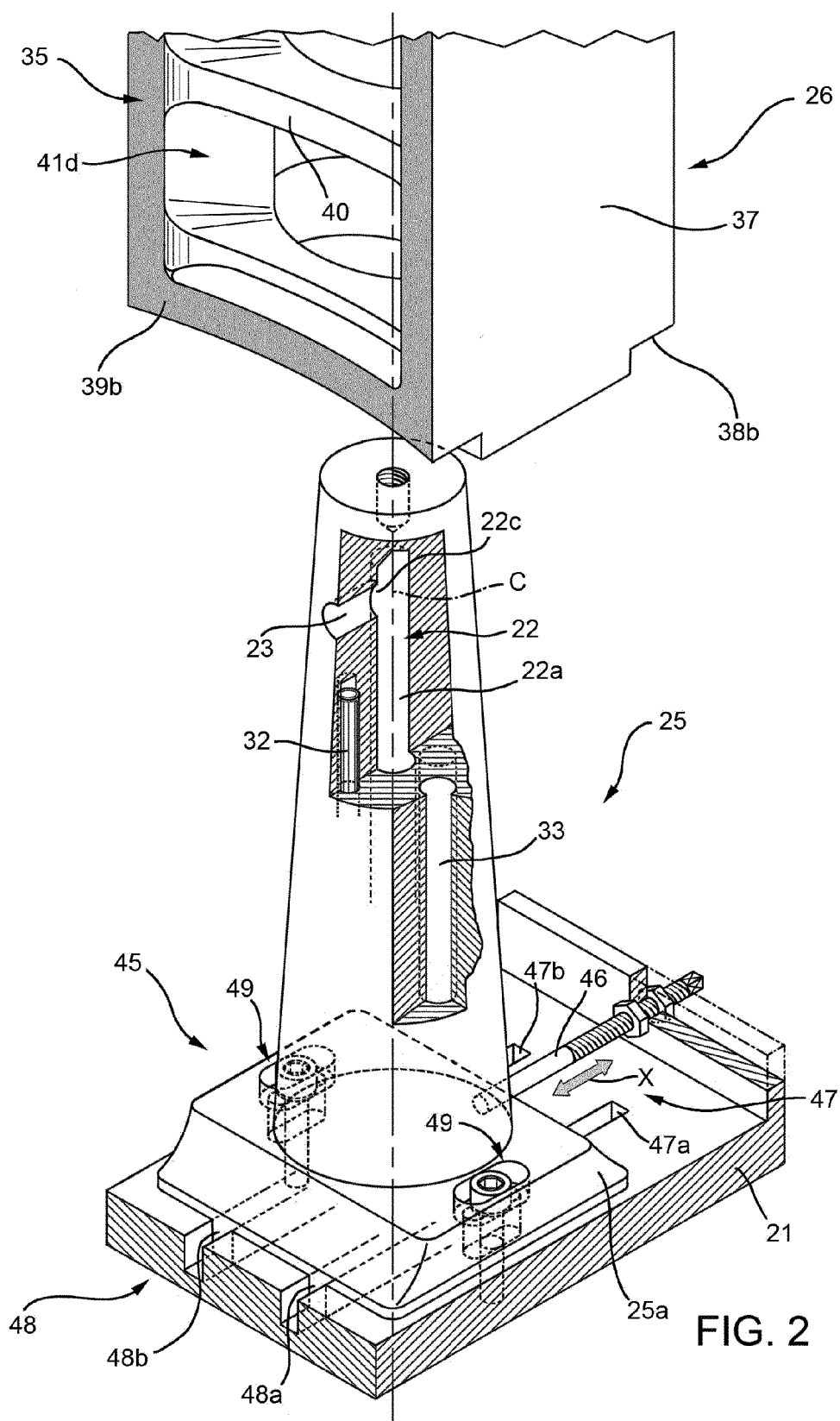
wherein the interaction portion (76) is adapted to delimit a transferring space (71'') through which glue is transferred from the outlet section (24'') to the outer lateral surface (6) of the glue roller (5).

11. The unit according to claim 10, wherein the interaction portion (76) of the contact frame (75) is configured to contact, on one side, the outer lateral surface (6) of the glue roller (5) and to cooperate, on the opposite side thereof, with the glue distribution bar (26'') through the interposition of the compressible delimiting element (77).

12. The unit according to claim 10 or 11, wherein the glue distribution bar assembly (8'') comprises displacement means (58'') cooperating with the contact frame (75) to displace the interaction portion (76) of the contact frame (75) itself to or away from the outer lateral surface (6) of the glue roller (5).

13. The unit according to any one of the preceding claims, wherein the bar support post (25) has a truncated cone configuration, and wherein the glue distribution bar (26, 26', 26'') has an internal shape complementary to that of the bar support post (25).





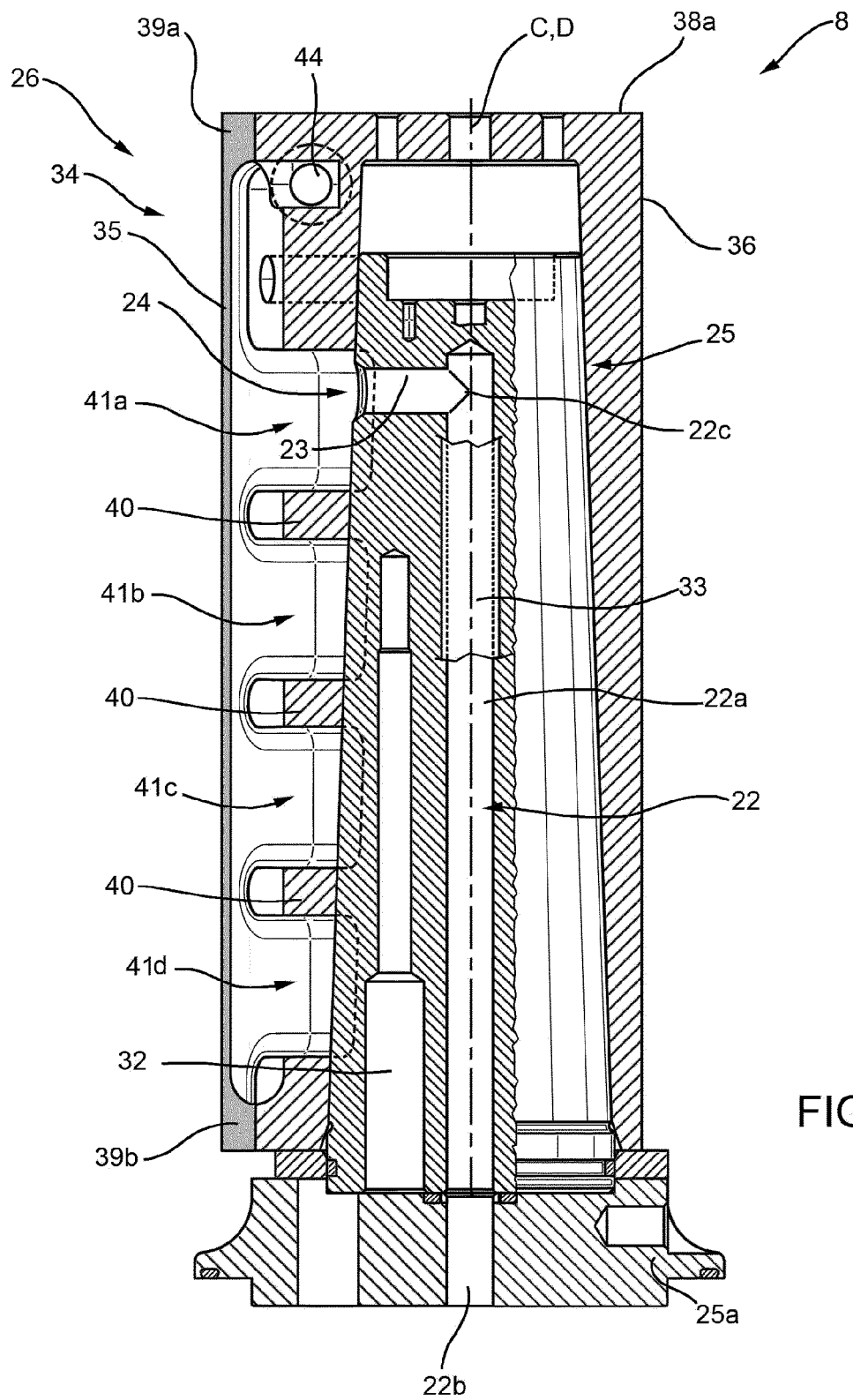


FIG. 3

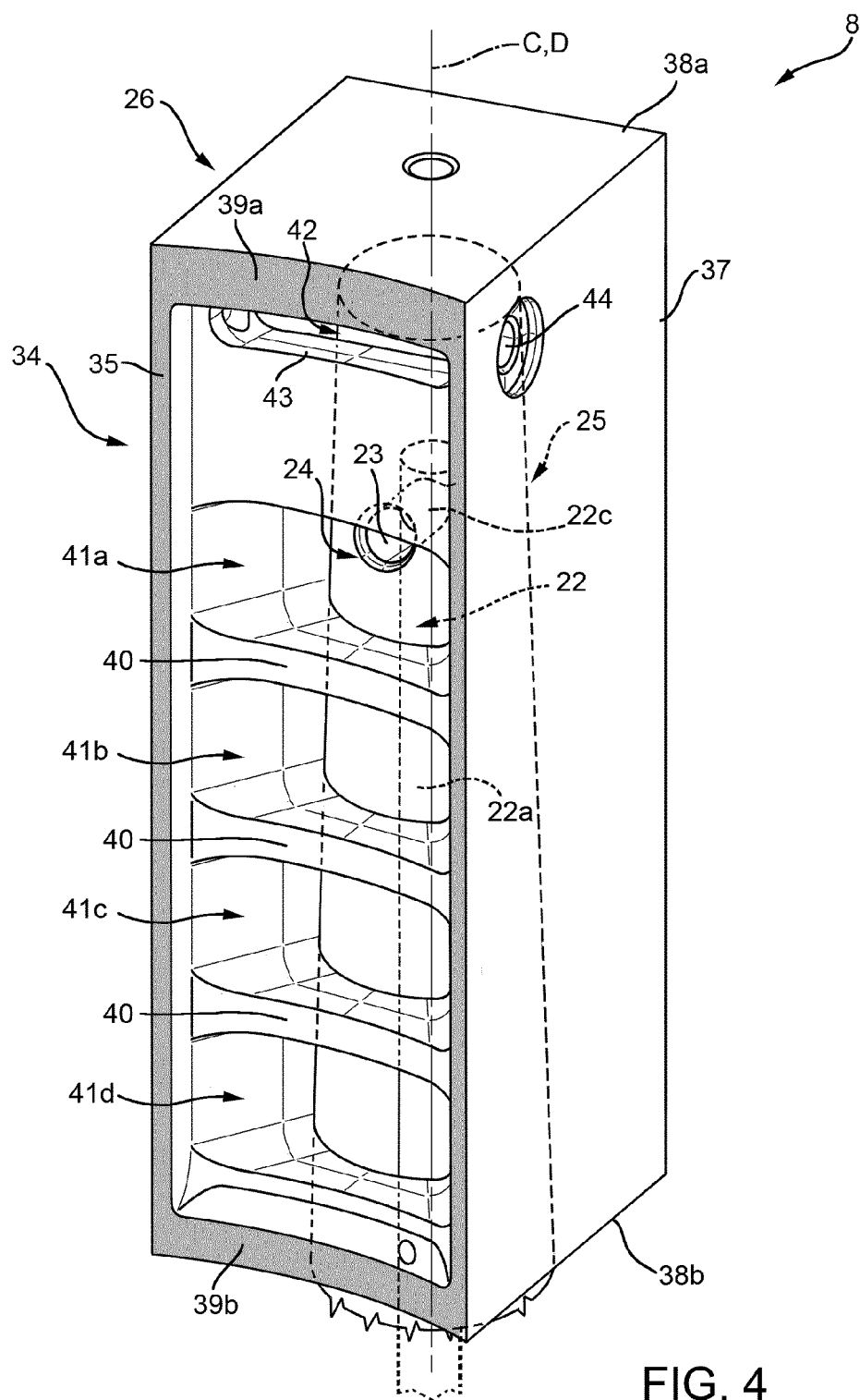


FIG. 4

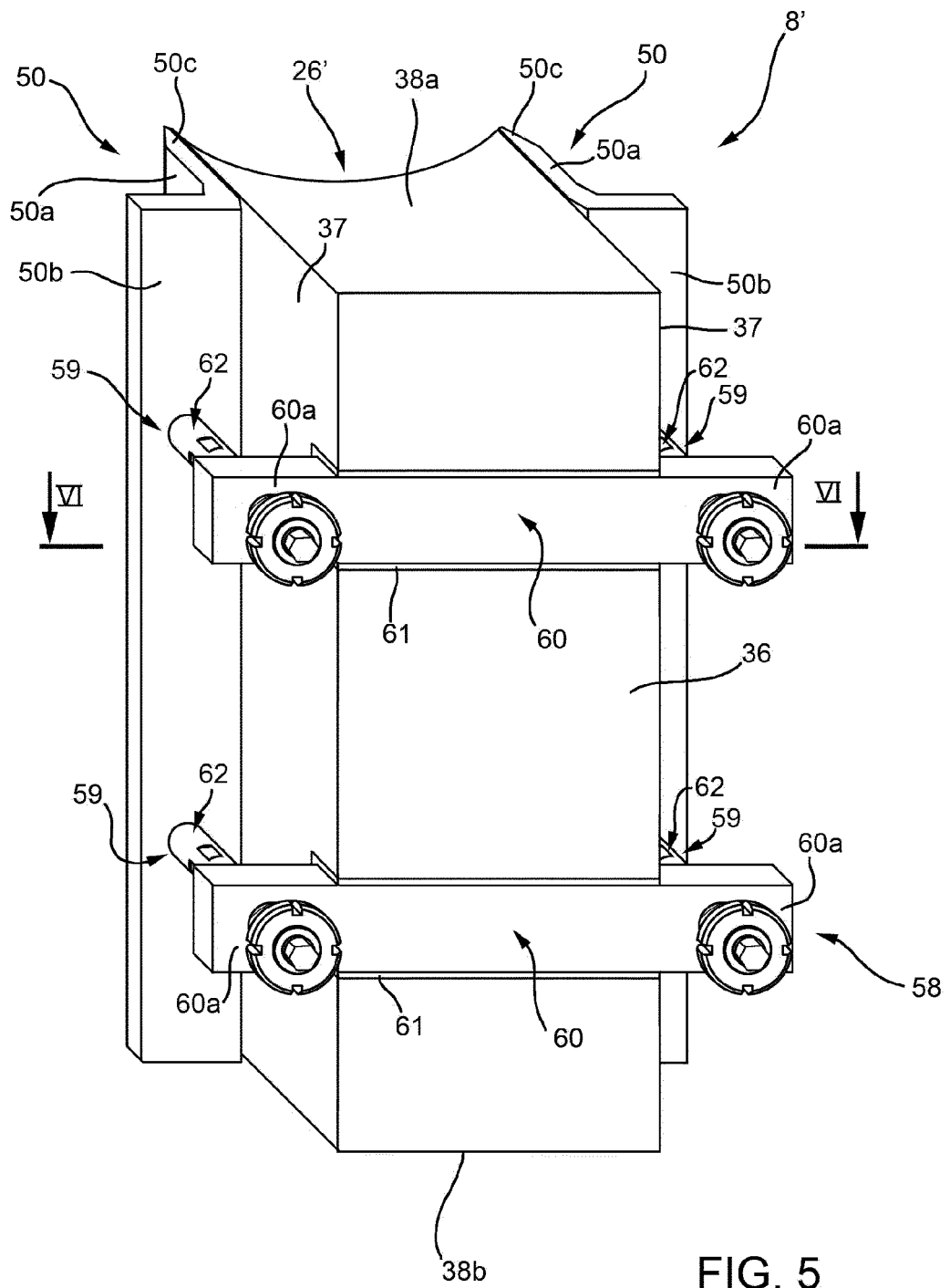
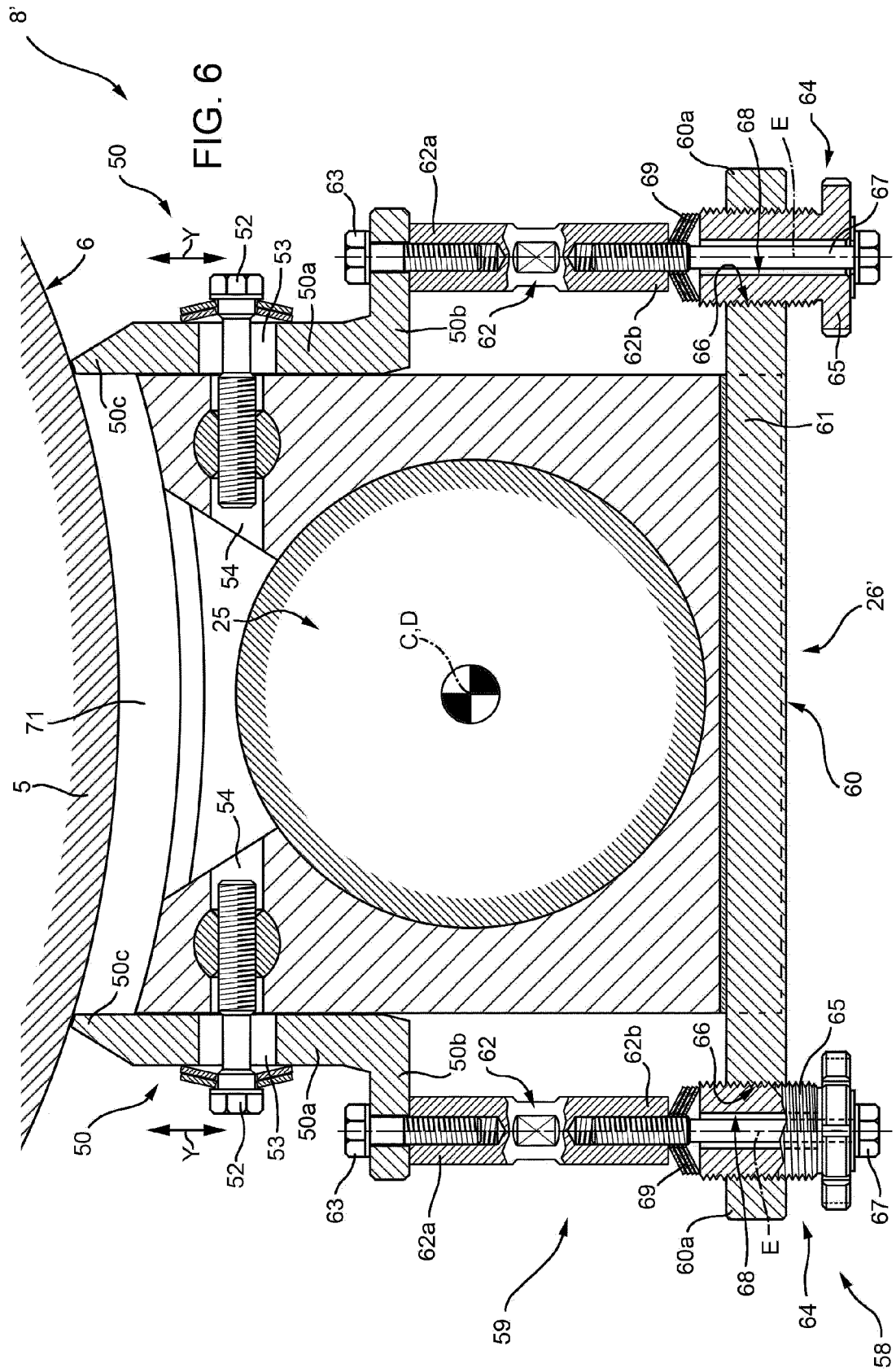
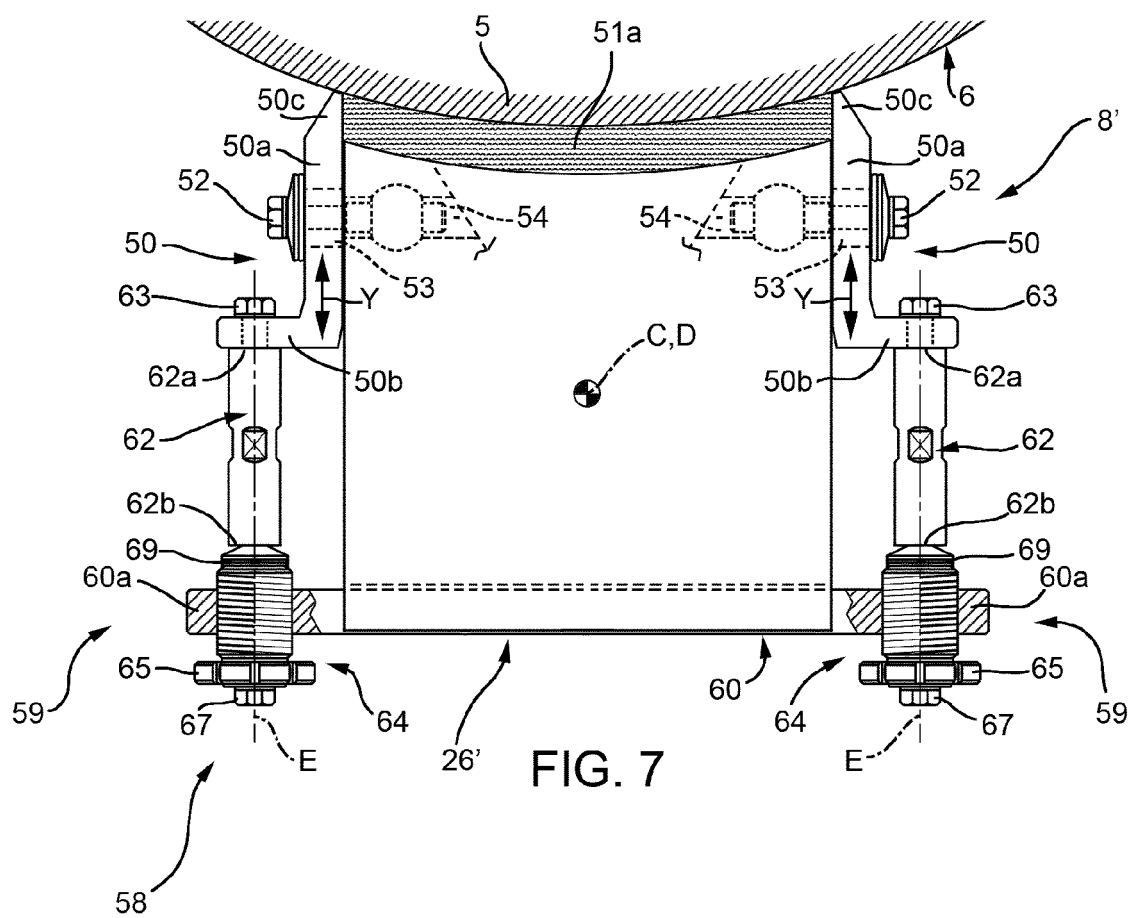


FIG. 5





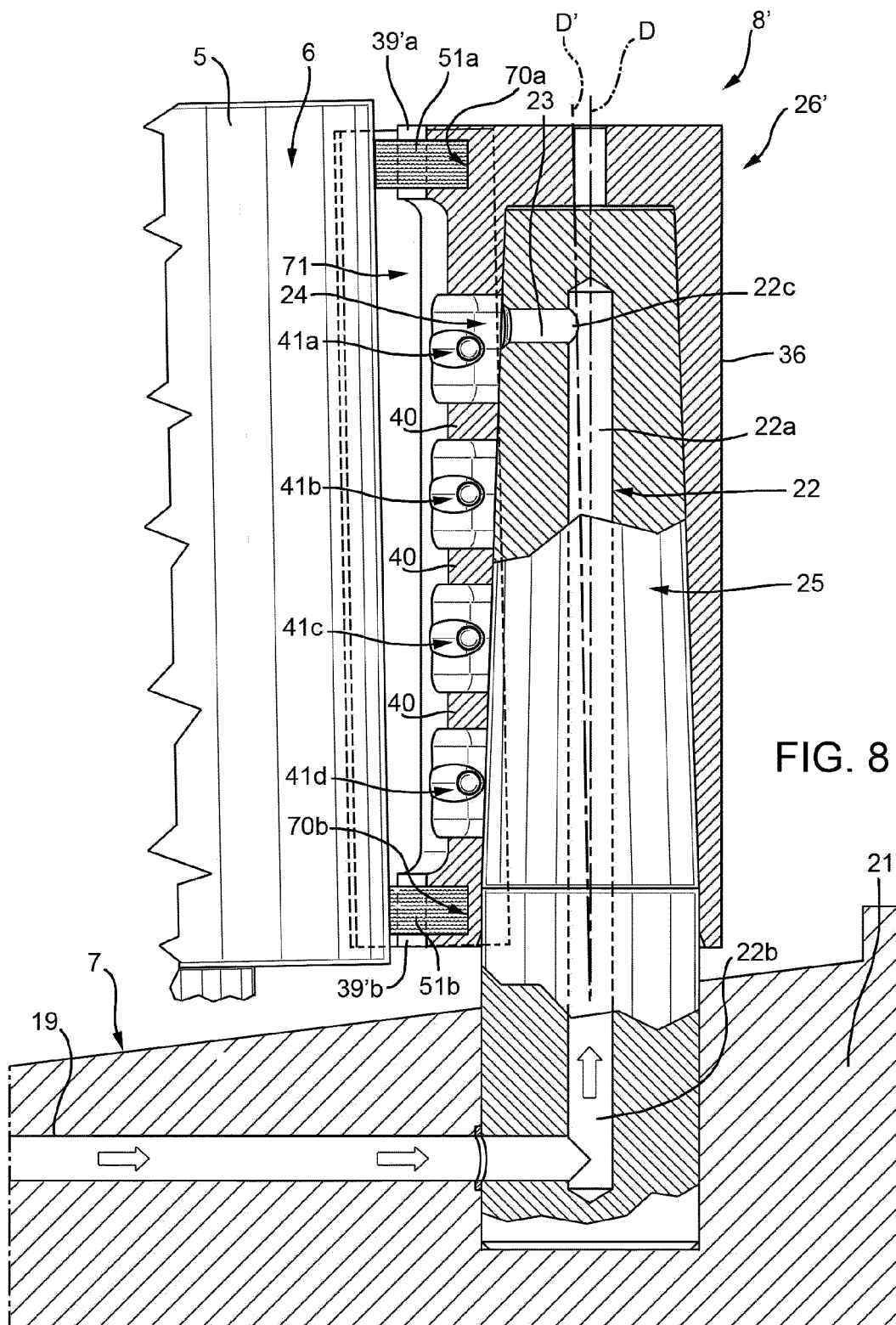
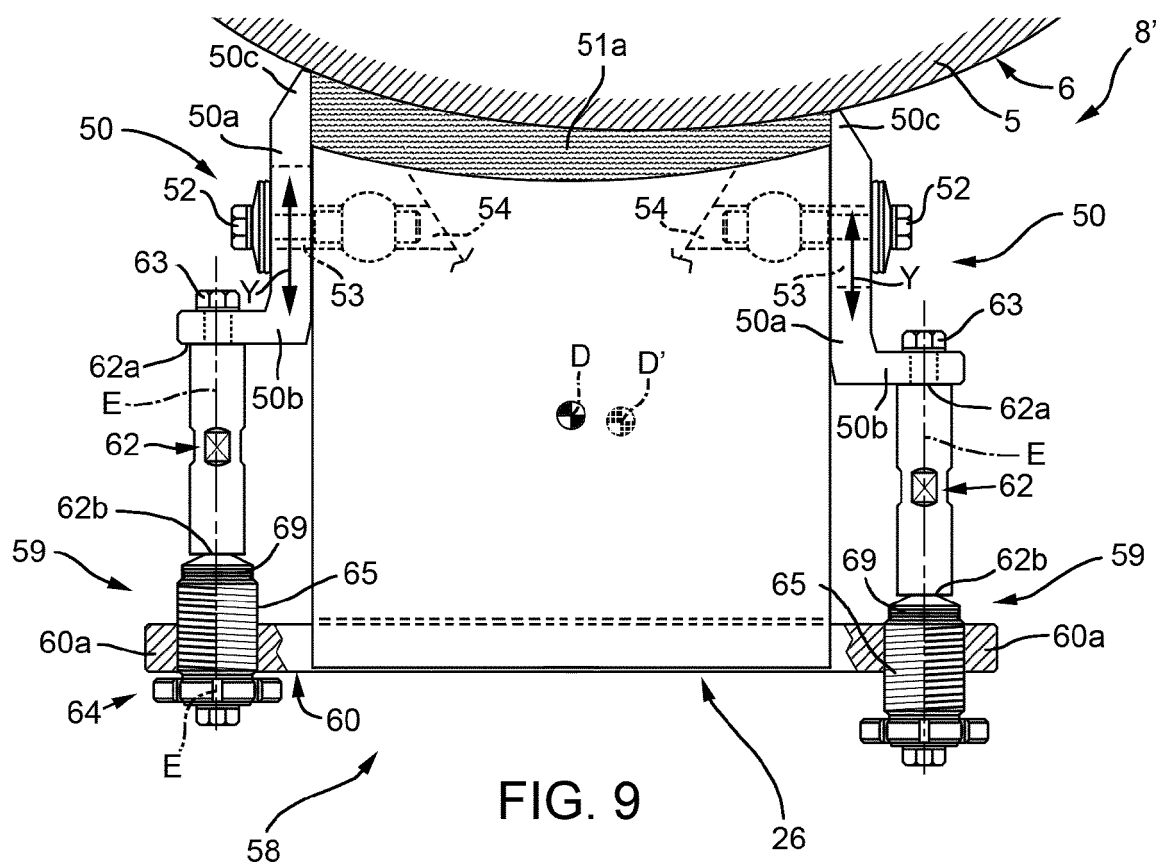


FIG. 8



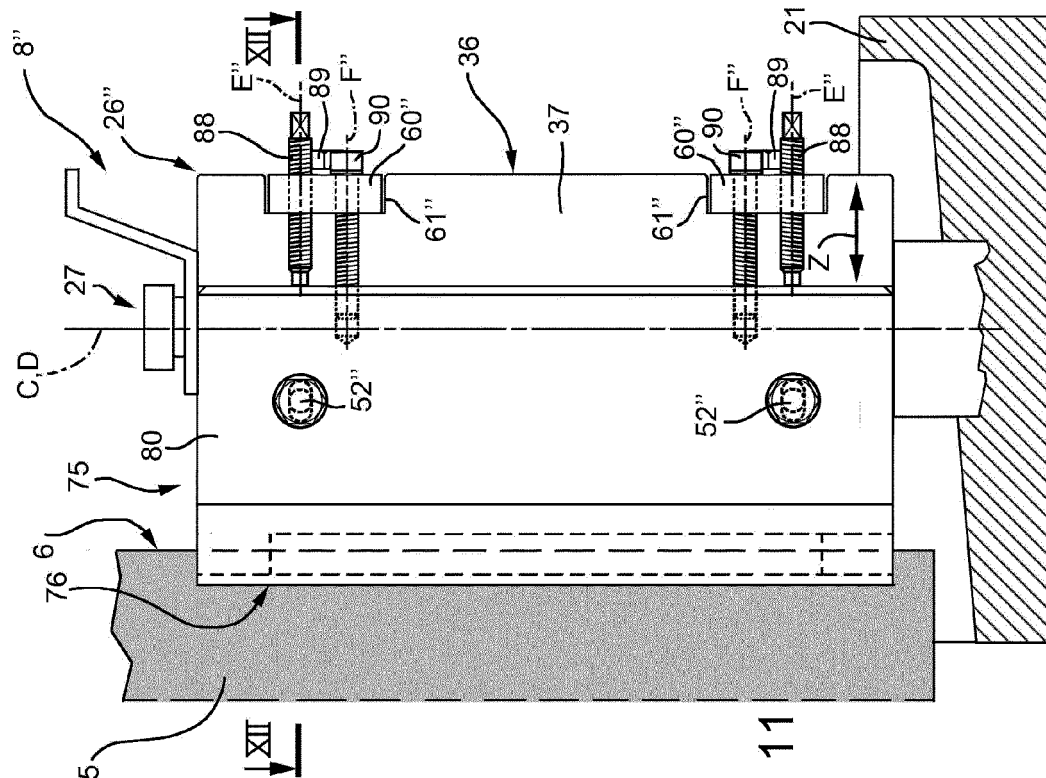


FIG. 11

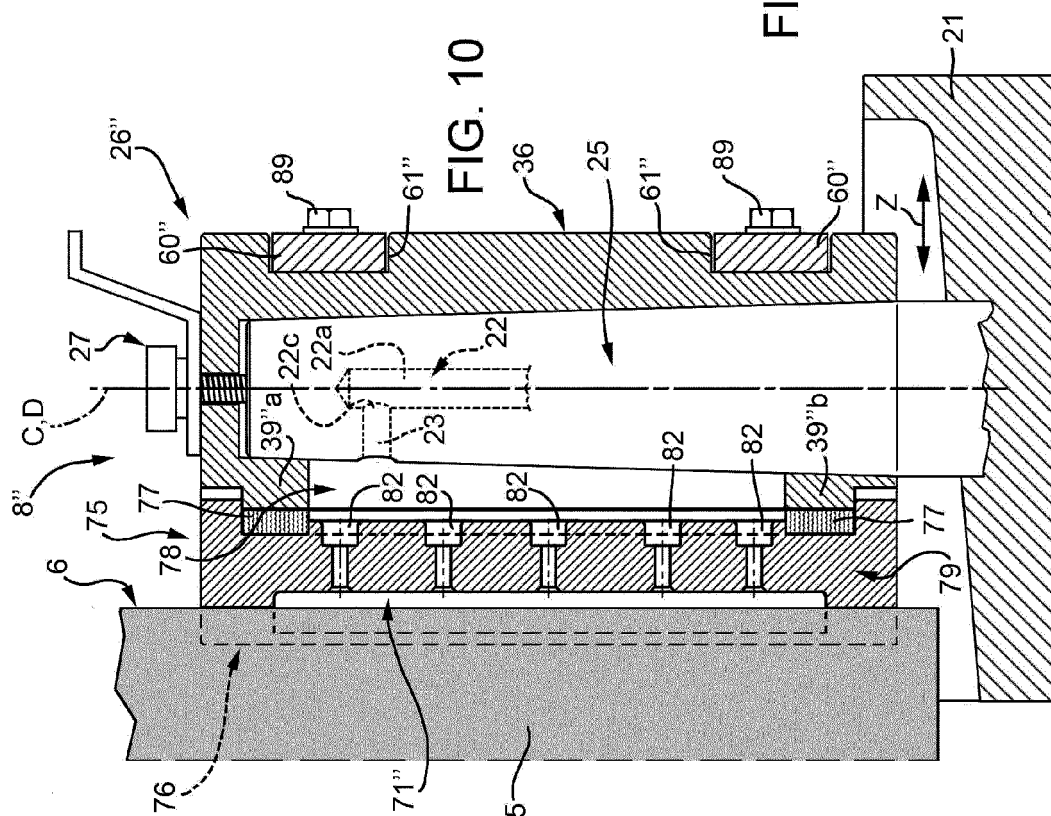
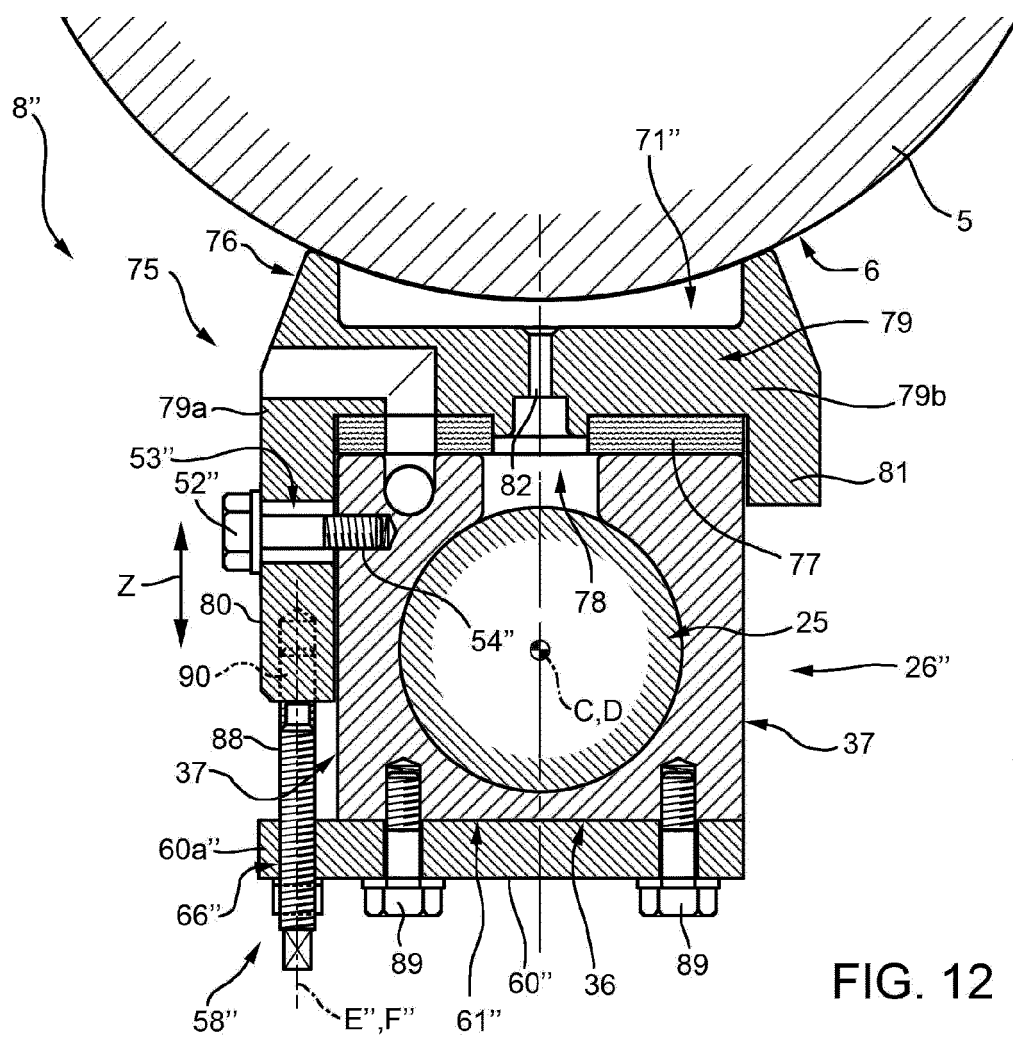


FIG. 10





EUROPEAN SEARCH REPORT

Application Number
EP 15 17 3030

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 388 200 A1 (KRONES AG [DE]) 23 November 2011 (2011-11-23)	1,3-13	INV. B65C9/22
Y	* paragraphs [0013], [0037], [0044], [0046], [0049]; figures 4, 5, 7-10 *	2	
Y	DE 102 03 658 A1 (KHS MASCH & ANLAGENBAU AG [DE]) 31 July 2003 (2003-07-31)	2	
A	* paragraphs [0002], [0005], [0006], [0008], [0018] *	3	
X	DE 20 59 234 A1 (ENZINGER UNION WERKE AG) 10 August 1972 (1972-08-10) * page 8, paragraph 3 - page 11, paragraph 1; figures 1-5 *	1,4-9	
A	US 4 347 095 A (YAMASHITA KYOICHI) 31 August 1982 (1982-08-31) * column 2, line 52 - column 3, line 23; figures 1-5 *	1,4-6, 10-12	TECHNICAL FIELDS SEARCHED (IPC)
			B65C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 November 2015	Examiner Luepke, Erik
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 17 3030

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2388200 A1	23-11-2011	CN 102310960 A	11-01-2012
		DE 102010022190 A1	24-11-2011
		EP 2388200 A1	23-11-2011
		EP 2505507 A1	03-10-2012
		US 2011287179 A1	24-11-2011

DE 10203658 A1	31-07-2003	NONE	

DE 2059234 A1	10-08-1972	NONE	

US 4347095 A	31-08-1982	JP S6042095 B2	20-09-1985
		JP S56106738 A	25-08-1981
		US 4347095 A	31-08-1982
