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(54) **RINSING MACHINE FOR BOTTLES AND METHOD FOR RINSING BOTTLES**
SPÜLMASCHINE FÜR FLASCHEN UND VERFAHREN ZUM SPÜLEN VON FLASCHEN
MACHINE DE RINÇAGE POUR BOUTEILLES ET PROCÉDÉ DE RINÇAGE DE BOUTEILLES

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Description

Field of application

[0001] The present invention relates to a rinsing machine for bottles and a method for rinsing bottles.

[0002] Advantageously, the rinsing machine according to the invention may be a single rinsing machine or a multiple rinsing machine, of the rotary type.

Prior art

[0003] Generally, a rinsing machine for bottles is inserted into a bottling line and is intended for washing or rinsing bottles before they are filled.

[0004] To perform its function, a rinsing machine is equipped with at least one rinsing head capable of handling one single bottle at a time. The rinsing machine is called a single rinsing machine if it is equipped with a single rinsing head and is thus capable of processing one bottle at a time, or a multiple rinsing machine if it is equipped with a plurality of rinsing heads and is therefore capable of treating multiple bottles at a time. In the latter case, generally, the machine is of the rotary type with the rinsing heads installed along the periphery of a rotating turret.

[0005] In a popular type of rinsing machine, each rinsing head comprises a gripper that is adapted to grasp the bottle, e.g. by its neck, to rotate it substantially 180° until the mouth of the bottle faces downward above an injection nozzle of a treatment product. The product is projected inside the bottle, and after hitting and wetting the inside wall of the bottle, it exits the upside-down bottle by gravity, falling into a special collection tank arranged under the rinsing head. From such a reservoir, the liquid is, for example, either piped to the drain or conveyed to a recycling circuit. Once the treatment liquid is discharged, the gripper returns the bottle to its normal position.

[0006] One of the problems with this type of rinsing machine is that the treatment liquid that comes out of the mouth often does not leave the bottle completely, but remains partially on the edge of the mouth. During subsequent bottling steps this liquid tends to drip from the mouth along the outer wall of the bottle, wetting it. This may compromise the labeling operation of the bottle. In fact, in many cases, since the label is not able to find a dry surface to adhere to, it does not stick perfectly to the bottle, but instead tends to peel off.

[0007] Furthermore, any residual treatment liquid that may remain on the mouth until the bottle is capped would then be trapped between the cap and the mouth. The presence of this residual liquid may create problems relating to bacteriological sterility.

[0008] Therefore, several solutions have been proposed to solve the problem of liquid remaining on the mouth. The most common solution is to equip each rinsing head with a suction tube adapted to suck the droplets from the mouth as the bottle moves from the

upside-down position to the normal position. An alternative solution involves equipping each rinsing head with a compressed air nozzle with which blasts of compressed air are generated that are to be directed onto the mouth.

[0009] These solutions do not, however, ensure that the mouth is fully dried, and in the case of the very distinctive mouths of bottles for spirits, they lose their effectiveness completely.

[0010] Thus, in the field of rinsing machines for bottles, there is a previously unmet need to significantly reduce the presence of liquid residue on the mouth of the bottle, in order to substantially eliminate the risk of wetting the outer surface of the bottle.

[0011] Furthermore, the development of compact bottling lines, which lack the space needed to accommodate bottle-drying stations after capping, has also heightened this need for bottlings other than wine, such as for spirits or other beverages that use unconventional bottle formats. US5277207A discloses a rinsing machine for bottles in accordance with the preamble of claim 1.

Disclosure of the invention

[0012] The main object of the present invention is therefore to eliminate all or part of the disadvantages of the aforementioned prior art by providing a rinsing machine for bottles which is capable of significantly reducing the presence of liquid residue on the mouth of the bottle in order to substantially eliminate the risk of wetting the outer surface of the bottle.

[0013] A further object of the present invention is to provide a rinsing machine for bottles which is easily adaptable to variations in the type of bottle "mouth."

[0014] A further object of the present invention is to provide a rinsing machine for bottles which is no more complex in operation than similar machines of a known type.

[0015] A further object of the present invention is to provide a rinsing machine for bottles which is no more complex in construction than similar machines of a known type.

Brief description of the drawings

[0016] The technical features of the invention, according to the aforesaid objects, may be clearly seen in the contents of the claims below, and its advantages will become more readily apparent in the detailed description that follows, made with reference to the accompanying drawings, which represent one or more purely exemplifying and non-limiting embodiments thereof, wherein:

- Fig. 1 shows a side orthogonal view of a rinsing machine for bottles according to a preferred embodiment of the invention, in a multiple, rotary-type version;
- Fig. 2 shows an orthogonal plan view of the machine in Fig. 1;

- Fig. 3 shows the machine from Fig. 1, in which some parts have been removed to better highlight others;
- Fig. 4 shows a perspective view of the top of the machine in Fig. 3;
- Fig. 5 shows an orthogonal cross-sectional view of the machine of Fig. 3 according to the cross-sectional plane A - A indicated therein;
- Fig. 6 shows an enlarged view of a detail from Fig. 5 enclosed in the circle denoted therein by VI;
- Fig. 7 shows a perspective view of a rinsing gripper of the rinsing machine in Fig. 1;
- Fig. 8 shows the rinsing gripper of Fig. 7 in an a-b-c-c sequence of four different operating positions;
- Fig. 8a, 9a, 10a and 11a correspond to the four enlarged views a, b, c, d of Fig. 8, respectively; in particular, Fig. 8a shows the gripper in the rest position with the bottle in the upright position, Fig. 11a shows the gripper in the working position with the bottle in the upside-down position, and Fig. 9a and 10a show the gripper in two successive intermediate positions;
- Fig. 8b, 9b, 10b, and 11b show the rinsing gripper illustrated in cross-section according to the cross-sectional plane B-B shown in Fig. 7, in the same operating positions as shown in Fig. 8a, 9a, 10a, and 11a, respectively;
- Fig. 12a and 12b show two enlarged views of a detail of Fig. 11b enclosed in the circle denoted therein by XII, before and after the fluid seal is made between the mouth and the annular sealing body, respectively;
- Fig. 13 shows a cross-sectional view of a component of the rinsing gripper corresponding to an annular sealing body shown in the assembled condition in Fig. 12; and
- Fig. 14 shows a perspective view from above of the annular sealing body shown in Fig. 13.

Detailed description

[0017] The present invention relates to a rinsing machine for bottles.

[0018] Advantageously, the rinsing machine according to the invention may be a single rinsing machine or a multiple rinsing machine, of the rotary type. Preferably, the rinsing machine according to the invention is a multiple, rotary-type rinsing machine.

[0019] The rinsing machine according to the invention will be indicated as a whole with reference numeral 1 in the accompanying figures.

[0020] Here and in the following description and claims, reference will be made to the rinsing machine 1 in the condition of use. Therefore, any references to a lower or upper position or to a horizontal or vertical orientation should be interpreted in this sense.

[0021] In the following, the bottle C will be said to be in the "upright" position when its mouth B is facing upwards and that it is in the "upside-down" position when its mouth

B is facing downwards.

[0022] According to a general embodiment of the invention, the rinsing machine 1 for bottles comprises:

- a support structure 2;
- one or more rinsing grippers 10 connected to said support structure 2, and
- means 3 for moving and operating grippers.

[0023] In turn, each rinsing gripper 10 comprises a fixing structure 11 anchored to said support structure 2 to connect the respective rinsing gripper 10 to said support structure 2.

[0024] Each rinsing gripper 10 further comprises a bottle manipulator 12 that is configured to releasably grasp a bottle, preferably at its neck.

[0025] The bottle manipulator 12 is movably connected to said fixing structure 11 to be moved by said means 3 for moving and operating grippers 10 between:

- a rest position, in which the manipulator 12 retains the bottle by orienting it with the respective mouth B facing upwards, i.e. in an upright position, and
- a working position, in which the manipulator 12 retains the bottle by orienting it with the respective mouth B facing downwards, i.e. in an upside-down position.

[0026] Advantageously, the bottle manipulator 12 may comprise at least one gripper adapted for grasping a bottle, preferably by its neck. In general, the gripper may be of any type as long as it serves the purpose. The structure, function, and mode of operation of these types of grippers are known per se to those skilled in the art and will therefore not be described here.

[0027] The means 3 for moving and operating grippers 10 may also be of any type, as long as they serve the purpose.

[0028] Advantageously, as illustrated in Fig. 1 to 5, in the preferred case in which the rinsing machine 1 is a rotary-type, multiple rinsing machine, the aforesaid support structure 2 consists of a turret rotating around a machine rotation axis A. In this case, the aforesaid means 3 for moving and operating grippers comprise a cam 3 for moving and guiding grippers, which cam extends around said rotating turret and is rotationally fixed. This cam 3 is kinematically connected to each rinsing gripper 10 to be guided and operated during the rotation motion of the turret as a function of the angular position assumed around the machine rotation axis A. Preferably said cam 3 for moving and guiding grippers is kinematically connected to the bottle manipulator 12 of each gripper 10 by a cam follower 30.

[0029] Each rinsing gripper 10 further comprises an injection nozzle 13 that is configured to inject a treatment liquid inside a bottle engaged by the respective bottle manipulator 12 through the mouth of the bottle itself when said manipulator 12 is in the working position, so as to

carry out the rinsing of the bottle itself. The nozzle 13 is connected to a supply circuit comprising a tank of treatment liquid and at least one pump.

[0030] Each rinsing gripper 10 further comprises a collection manifold 14 for collecting the treatment liquid that, after injection, exits the bottle by gravity.

[0031] The exit of treatment liquid from the bottle (or draining) starts as soon as the injection finishes when the manipulator 12 is still in the working position with the bottle upside down and continues until the bottle assumes a horizontal position in the movement back to the upright position.

[0032] Advantageously, each rinsing gripper 10 may comprise suction means 15 for sucking the treatment liquid residues remaining on the bottle, and particularly on the mouth.

[0033] According to the invention, the collection manifold 14:

- comprises a collection mouth 141 provided with an annular sealing body 142 at which said collection manifold 14 is fluidically connectable to the bottle at its mouth; and
- is movably connected to said fixing structure 11 to be movable in a coordinated manner with the bottle manipulator 12 by movement means 16.

[0034] The movement means 16 are configured so that, when said collection manifold 14 is moved, it follows the movement of the manipulator 12 at least for all the positions assumed by the manipulator 12 itself between the working position and a predetermined intermediate position between the working position and the rest position, while remaining fluidically connected to the bottle grasped by the manipulator 12.

[0035] Furthermore, the annular sealing body 142 is provided with a conical conveying portion 143 intended to be sealingly inserted inside the mouth B so as to convey the treatment liquid exiting the bottle directly inside the collection manifold 14. In this way, a preferential path is created for discharging the liquid into the manifold, significantly reducing the risk of the liquid running on the outside of the mouth and thus possibly forming a liquid ring on the mouth.

[0036] Advantageously, the manipulator 12 defines a bottle centering axis X, which in use is aligned with the central axis of the bottle C passing through the mouth B.

[0037] In accordance with a preferred embodiment shown in the accompanying figures, the movement means 16 of the manifold 14 comprise:

- a first mechanism 161 configured to make the manifold 14 kinematically integral with the manipulator 12 at least for all the positions assumed by the manipulator 12 itself between the working position and said predetermined intermediate position, at which the conical conveying portion (143) of the annular sealing body (142) is axially aligned with the bottle cen-

tering axis X of the manipulator 12; and

- a second mechanism 162 configured to axially push said annular sealing body 142 toward said manipulator 12 so as to abuttingly bring the conical conveying portion 143 against the mouth B.

[0038] In this way, the movement of the manipulator 12 itself determines the movement of the manifold 14.

[0039] Operatively, the second mechanism 162 makes it possible to:

- improve the seal between the annular sealing body 142 and the mouth B, and
- adapt the annular sealing body 142 to dimensional variations in the mouth B due to the pressure exerted by the mechanism 162.

[0040] Preferably, the manifold 14 comprises a main tubular body 144 and a secondary tubular body 145 which is mounted axially floating on the main tubular body 144 and which supports said annular sealing body 142.

[0041] Preferably, the bottle manipulator 12 and the manifold 14 are both rotationally connected to said fixing structure 11 around a same rotation axis Y.

[0042] More specifically, the first mechanism comprises a first guide cam 161 that is integral in rotation with said manipulator 12 and is kinematically engaged by said manifold 14 to move it in a guided manner, transferring the rotation motion of the manipulator 12 thereto.

[0043] This first guide cam 161a has:

- a circumference arc section 161' concentric to said rotation axis Y along which the manifold 14 is kinematically decoupled from the rotation of said manipulator 12 and
- a straight section 161" extending radially with respect to said rotation axis Y parallel to said centering axis X and along which the manifold 14 is kinematically coupled to the rotation of said manipulator 12.

[0044] Advantageously, the connection point between the circumference arc section 161' and the straight section 161" of said first guide cam 161 defines said predetermined intermediate position.

[0045] Preferably, the second mechanism 162 comprises elastic means that are interposed between the main tubular body 144 and the secondary tubular body 145 of said manifold 14 and are configured to impose an axial thrust on said secondary tubular body 145 and on the associated annular sealing body 142 with respect to said main tubular body 144.

[0046] Advantageously, the movement means 16 of the manifold 14 comprise a second guide cam 163, which is integral to said fixing structure 11 and is engaged by said main tubular body 144. Said second guide cam 163 is shaped to guide the rotation movement of the manifold 14 around said rotation axis Y, in cooperation with the first

mechanism 161. In particular, the main tubular body 144 of the manifold 14 is guided by said second guide cam 163 when the secondary tubular body 145 engages the straight section 161" of the first guide cam 161.

[0047] The sequence of steps of coordinated movement of the manipulator 12 and the manifold 14 from the rest position to the working position are shown in Fig. 8 to 11.

[0048] In accordance with a particularly preferred aspect of the invention, as illustrated in the accompanying figures, the aforesaid suction means 15 comprise a plurality of suction holes 151 which are fluidically connected to a suction chamber 152 and are obtained on said annular sealing body 142 all around said conical conveying portion 143 in a position such that in use they at least partially face the interior of the mouth of the bottle. Said suction means 15 may be activated by connecting the suction chamber 152 to a vacuum source for sucking, through said suction holes 151, any residual treatment liquid R which has potentially accumulated between the inside of the mouth B and the conical conveying portion 143, as shown in Fig. 12b.

[0049] Advantageously, due to their location, the suction holes 151 are potentially able to suck treatment liquid that may have run onto the outside of the mouth of the bottle.

[0050] Contrary to the conventional solutions involving suction limited to a portion of the mouth, the suction means 15 according to the present invention allow for a suction action distributed along the entire circumferential extension of the mouth of the bottle, thus ensuring a more effective and efficient removal of any residual liquid.

[0051] Advantageously, as shown in particular in Fig. 12, 13 and 14, said annular sealing body 142 further delimits an annular collection channel 147, which extends concentrically to said conical conveying portion 143 outside the plurality of suction holes 151 and is suitable for collecting any residual treatment liquid not sucked by said plurality of suction holes 151 and which may run onto the outside of the mouth B. Preferably, the suction means 15 comprise at least one discharge hole 153 which is obtained at the bottom of said annular collection channel 147 and is fluidically connected to said suction chamber 152. In this case, operatively, when the suction means 14 are activated, a suction action is exerted both directly on the inside of the mouth of the bottle by the suction holes 151 and on the annular collection channel 147 by the discharge hole 153, implementing a particularly complete removal of the residual liquid.

[0052] In particular, as noted above, said manifold 14 comprises a main tubular body 144 and a secondary tubular body 145 which is mounted axially floating on the main tubular body 144 and which supports said annular sealing body 142.

[0053] Advantageously, the aforesaid annular sealing body 142 is separably associated with the secondary tubular body 145 of the manifold 14. In this way, the annular sealing body 142 may be easily replaced in case

of wear to the component or in the event of a change in the size of the mouth of the bottles processed by the rinsing machine 1.

[0054] Preferably, as shown in the accompanying figures, the aforesaid injection nozzle 13 is fixed to said fixing structure 11 and extends in length until it reaches the interior of said manifold 14.

[0055] Advantageously, the manifold 14 has a slot 148 to allow the free passage of said injection nozzle 13 and thus the relative movements between the nozzle 13 (fixed) and the manifold 14 (movable).

[0056] The present invention relates to a method for rinsing a bottle by means of a rinsing machine 1.

[0057] This method comprises the following operating steps:

- a) providing a rinsing machine 1 according to the invention, and in particular as described above;
- b) grasping a bottle to be rinsed with the respective mouth facing upwards by means of the bottle manipulator 12 of a rinsing gripper 10 of said machine 1, said manipulator 12 being in the rest position;
- c) moving said manipulator 12 from said rest position to said working position, so as to orient the bottle with the respective mouth facing downwards;
- d) injecting treatment liquid inside the bottle by means of the injection nozzle 13 when the manipulator 12 is in the working position;
- e) in the passage of said manipulator 12 from said rest position to said working position, fluidically connecting the mouth of the bottle to the collection mouth 141 of the collection manifold 14 at the annular sealing body 142, inserting the conical conveying portion 143 inside the mouth, so as to convey the treatment liquid exiting the bottle directly inside the collection manifold 14, thereby creating a preferential path for discharging liquid into the manifold, significantly reducing the amount of residual liquid that may accumulate on the mouth. This reduces the risk of liquid running onto the outside of the mouth and thus the possibility of a liquid ring forming on the mouth;
- f) moving said manipulator 12 from said working position to said rest position so as to orient the bottle again with the respective mouth facing upwards, fluidically disconnecting the mouth of the bottle from the collection mouth 141 of the collection manifold 14.

[0058] Advantageously, after step f) the manipulator 12 may release the bottle.

[0059] Preferably, the method comprises a step g) of sucking any residual treatment liquid R which may have accumulated between the conical conveying portion 143 and the interior of the mouth through the plurality of suction holes 151 which are obtained on said annular sealing body 142 all around said conical conveying portion 143.

[0060] Advantageously, as already pointed out, unlike conventional solutions involving suction limited to a portion of the mouth, the suction means 15 according to the present invention make it possible to carry out a suction action distributed along the entire circumferential extension of the mouth of the bottle, thus ensuring a more effective and efficient removal of any residual liquid before it runs onto the outside of the mouth.

[0061] Advantageously, the sucking step g) may be carried out at any time after the injecting step d) before fluidically disconnecting the mouth of the bottle from the collection mouth 141 of the collection manifold 14.

[0062] Preferably, the sucking step g) is carried out during step f) of moving said manipulator 12 from said working position to said rest position, in particular until the moment when the collection mouth 141 of the collection manifold 14 is fluidically disconnected from the mouth of the bottle. In this way, the suction action is prolonged until the most critical stage of draining, which is when the fluid seal between the mouth and the annular sealing body is broken.

[0063] The invention allows numerous advantages to be obtained, which have already been described in part.

[0064] The rinsing machine 1 for bottles according to the invention makes it possible to significantly reduce the presence of liquid residue on the mouth of the bottle, substantially eliminating the risk of a liquid ring forming on the mouth and wetting the outer surface of the bottle.

[0065] In particular, the rinsing machine 1 according to the invention makes it possible to significantly reduce the residual treatment liquid that could run on the mouth, due to the fact that a preferential exit path for the treatment liquid from the bottle into the manifold is created.

[0066] Second, the rinsing machine 1 for bottles according to the invention allows for the suction of any residual liquid that may have accumulated between the inside of the mouth and the conical conveying portion, substantially eliminating the risk of residual liquid running onto the outside of the mouth.

[0067] In addition, the rinsing machine 1 for bottles according to the invention is easily adaptable to variations in the type of bottle "mouths."

[0068] The rinsing machine 1 for bottles according to the invention is no more complex in operation than similar machines of a known type.

[0069] The rinsing machine 1 for bottles according to the invention is no more complex in construction than similar machines of a known type.

[0070] The invention thus conceived therefore achieves the intended objectives thereof.

[0071] Obviously, in practice it may also assume different forms and configurations from the one illustrated above, as long as it does not depart from the present scope of protection represented by the appended claims.

[0072] Furthermore, the dimensions, shapes, and materials used may be any according to the needs.

Claims

1. Rinsing machine (1) for bottles, comprising:

- a support structure (2);
- one or more rinsing grippers (10) connected to said support structure (2),
- means (3) for moving and operating grippers (10), wherein each rinsing gripper (10) comprises:
 - a fixing structure (11) anchored to said support structure (2) to connect the respective rinsing gripper to said support structure (2);
 - a bottle manipulator (12) which is configured to releasably grasp a bottle and is movably connected to said fixing structure (11) to be moved by said means (3) for moving and operating grippers (10) between a rest position in which the manipulator (12) retains the bottle by orienting it with the respective mouth facing upwards, and a working position, in which the manipulator (12) retains the bottle by orienting it with the respective mouth facing downwards,
 - an injection nozzle (13) which is configured to inject a treatment liquid inside a bottle engaged by the respective bottle manipulator (12) through the mouth of the bottle itself when said manipulator (12) is in the working position;
 - a collection manifold (14) for collecting the treatment liquid which, after the injection by means of said nozzle (13), exits the bottle by gravity;
 - suction means (15) for sucking the remaining treatment liquid residues remaining on the bottle,

characterised in that said collection manifold (14):

- comprises a collection mouth (141) provided with an annular sealing body (142) at which said collection manifold (14) is fluidically connectable to the bottle at its mouth; and
- is movably connected to said fixing structure (11) to be movable in a coordinated manner with the bottle manipulator (12) by movement means (16),

wherein said movement means (16) are configured so that when said collection manifold (14) is moved it follows the movement of the manipulator (12) at least for all the positions assumed by the manipulator (12) itself between the working position and a predetermined intermediate position between the working position and the rest position while remaining fluidically connected to the bottle grasped by the manipulator (12), and wherein said annular sealing body (142) is provided with a conical conveying portion (143) intended to be sealingly inserted inside the

mouth so as to convey the treatment liquid exiting the bottle directly inside the collection manifold (14), thereby creating a preferential path for discharging the liquid in the manifold.

2. Rinsing machine (1) according to claim 1, wherein the manipulator (12) defines a bottle centring axis (X) which in use is aligned with the central axis of the bottle (C) passing through the mouth (B) and wherein the movement means (16) of the manifold (14) comprise:

- a first mechanism (161) configured to make the manifold (14) kinematically integral with the manipulator (12) at least for all the positions assumed by the manipulator (12) itself between the working position and said predetermined intermediate position, at which the conical conveying portion (143) of the annular sealing body (142) is axially aligned with the bottle centring axis (X) of the manipulator (12); and
- a second mechanism (162) configured to axially push said annular sealing body (142) towards said manipulator (12) so as to abuttingly bring the conical conveying portion (143) against the mouth (B).

3. Rinsing machine (1) according to claim 1 or 2, wherein said manifold (14) comprises a main tubular body (144) and a secondary tubular body (145) which is mounted axially floating on the main tubular body (144) and which supports said annular sealing body (142).

4. Rinsing machine (1) according to claim 2 or 3, wherein the bottle manipulator (12) and the manifold (14) are both rotationally connected to said fixing structure (11) around a same rotation axis (Y) and wherein said first mechanism comprises a first guide cam (161) which is integral in rotation with said manipulator (12) and is kinematically engaged by said manifold (14) to move it in a guided manner, transferring the rotation motion of the manipulator (12) thereto, said first guide cam (161) having:

- a circumference arc section (161') concentric to said rotation axis (Y) along which the manifold (14) is kinematically decoupled from the rotation of said manipulator (12) and
- a straight section (161'') extending radially with respect to said rotation axis (Y) parallel to said centring axis (X) and along which the manifold (14) is kinematically coupled to the rotation of said manipulator (12).

5. Rinsing machine (1) according to claim 4, wherein the connection point between the circumference arc section (161') and the straight section (161'') of said

first guide cam (161a) defines said predetermined intermediate position.

6. Rinsing machine (1) according to claim 3, 4 or 5, wherein said second mechanism (162) comprises elastic means which are interposed between the main tubular body (144) and the secondary tubular body (145) of said manifold (14) and are configured to impose an axial thrust on said secondary tubular body (145) and on the associated annular sealing body (142) with respect to said main tubular body (144).

7. Rinsing machine (1) according to any one of claims 4 to 6, wherein the movement means (16) of the manifold (14) comprise a second guide cam (163) which is integral with said fixing structure (11) and is engaged by said main tubular body (144), said second guide cam (163) being shaped to guide the rotation movement of the manifold (14) around said rotation axis (Y).

8. Rinsing machine (1) according to any one of the preceding claims, wherein said suction means (15) comprise a plurality of suction holes (151) which are fluidically connected to a suction chamber (152) and are obtained on said annular sealing body (142) all around said conical conveying portion (143) in a position such that in use they at least partly face the interior of the mouth of the bottle and wherein said suction means (15) can be activated by connecting the suction chamber (152) to a vacuum source for sucking, through said suction holes (151), residual treatment liquid (R) which has possibly accumulated between the inside of the mouth (B) and the conical conveying portion (143).

9. Rinsing machine (1) according to claim 8, wherein said annular sealing body (142) delimits an annular collection channel (147) which extends concentrically to said conical conveying portion (143) outside the plurality of suction holes (151) and is suitable to collect any residual treatment liquid not sucked by said plurality of suction holes (151) and wherein said suction means (15) comprise at least one discharge hole (153) which is obtained on the bottom of said annular collection channel (147) and is fluidically connected to said suction chamber (152).

10. Rinsing machine (1) according to claim 3 or claims 4 to 9 when dependent on claim 3, wherein said annular sealing body (142) is detachably associated with the secondary tubular body (145) of the manifold (14).

11. Rinsing machine (1) according to any one of the preceding claims, wherein said injection nozzle (13) is fixed to said fixing structure (11) and extends

in length until it reaches the interior of said manifold (14).

12. Rinsing machine (1) according to claim 11, wherein said manifold (14) has a slot (148) to allow the free passage of said injection nozzle (13) and thus relative movements between nozzle (13) and manifold (14). 5
13. Rinsing machine (1) according to any one of the preceding claims, wherein said rinsing machine (1) is a multiple machine of the rotary type and wherein said support structure (2) consists of a turret rotating around a machine rotation axis (A), said means (3) for moving and operating grippers comprising a cam of gripper movement and guide (3) which extends around said rotating turret and is rotationally fixed and to which each rinsing gripper (10) is kinematically connected to be guided and operated during the rotation movement of the turret as a function of the angular position assumed around the machine rotation axis (A), preferably said cam of gripper movement and guide (3) being kinematically connected to the bottle manipulator (12) of each gripper (10). 10 15 20 25
14. Method for rinsing a bottle by means of a rinsing machine (1) according to any one of the preceding claims, comprising the following operating steps:
 - a) providing a rinsing machine (1) according to any one of the preceding claims; 30
 - b) grasping the bottle to be rinsed with the respective mouth facing upwards by means of the bottle manipulator (12) of a rinsing gripper (10) of said machine (1), said manipulator (12) being in the rest position; 35
 - c) moving said manipulator (12) from said rest position to said working position, so as to orient the bottle with the respective mouth facing downwards; 40
 - d) injecting the treatment liquid inside the bottle by means of the injection nozzle (13) when the manipulator (12) is in the working position; 45
 - e) in the passage of said manipulator (12) from said rest position to said working position, fluidically connecting the mouth of the bottle to the collection mouth (141) of the collection manifold (14) at the annular sealing body (142), inserting the conical conveying portion (143) inside the mouth, so as to convey the treatment liquid exiting the bottle directly inside the collection manifold (14), thereby creating a preferential path for discharging the liquid in the manifold; 50
 - f) moving said manipulator (12) from said working position to said rest position, so as to orient the bottle again with the respective mouth facing upwards, fluidically disconnecting the mouth of the bottle from the collection mouth (141) of the 55

collection manifold (14) .

15. Method according to claim 14, comprising a step g) of sucking any residual treatment liquid which may have accumulated between the conical conveying portion (143) and the interior of the mouth through the plurality of suction holes (151) which are obtained on said annular sealing body (142) all around said conical conveying portion (143).
16. Method according to claim 15, wherein the sucking step g) is carried out after the injecting step d), preferably during the step f) of moving said manipulator (12) from said working position to said rest position.

Patentansprüche

1. Spülmaschine (1) für Flaschen, umfassend:

- eine Stütz- bzw. Trägerstruktur (2);
- einen oder mehrere Spülgreifer (10), die mit der Trägerstruktur (2) verbunden sind,
- Mittel (3) zum Bewegen und Bedienen von Greifern (10), wobei jeder Spülgreifer (10) umfasst:
- eine Fixier- bzw. Befestigungsstruktur (11), die an der Trägerstruktur (2) verankert ist, um den jeweiligen Spülgreifer mit der Trägerstruktur (2) zu verbinden;
- einen Flaschenmanipulator bzw. -bediener (12), der konfiguriert ist, eine Flasche lösbar zu greifen, und beweglich bzw. bewegbar mit der Befestigungsstruktur (11) verbunden ist, um von den Mitteln (3) zum Bewegen und Bedienen von Greifern (10) zwischen einer Ruheposition, in welcher der Manipulator (12) die Flasche zurückhält, indem er sie mit der jeweiligen Öffnung nach oben gewandt ausrichtet, und einer Arbeitsposition bewegt zu werden, in welcher der Manipulator (12) die Flasche zurückhält, indem er sie mit der jeweiligen Öffnung nach unten gewandt ausrichtet,
- eine Einspritzdüse (13), die konfiguriert ist, eine Behandlungsflüssigkeit in eine Flasche, die durch den jeweiligen Flaschenmanipulator (12) in Eingriff genommen ist, durch die Öffnung der Flasche selbst einzuspritzen, wenn sich der Manipulator (12) in der Arbeitsposition befindet;
- einen Sammelverteiler (14) zum Sammeln der Behandlungsflüssigkeit, die nach dem Einspritzen mittels der Düse (13) durch Schwerkraft aus der Flasche austritt;
- Saugmittel (15) zum Absaugen der verbleibenden Behandlungsflüssigkeitsreste, die an bzw. auf der Flasche verbleiben, **dadurch gekennzeichnet, dass** der Sammelverteiler (14):

- eine Sammelöffnung (141) umfasst, die mit einem ringförmigen Dichtungskörper (142) versehen ist, an dem der Sammelverteiler (14) fluidisch mit der Flasche an seiner Öffnung verbindbar ist; und
- beweglich bzw. bewegbar mit der Befestigungsstruktur (11) verbunden ist, um auf koordinierte Weise mit dem Flaschenmanipulator (12) durch Bewegungsmittel (16) beweglich bzw. bewegbar zu sein,

wobei die Bewegungsmittel (16) so konfiguriert sind, dass wenn der Sammelverteiler (14) bewegt wird, er der Bewegung des Manipulators (12) zumindest für alle Positionen folgt, die der Manipulator (12) selbst zwischen der Arbeitsposition und einer vorbestimmten Zwischenposition zwischen der Arbeitsposition und der Ruheposition einnimmt, während er fluidisch mit der durch den Manipulator (12) ergriffenen Flasche verbunden bleibt, und wobei der ringförmige Dichtungskörper (142) mit einem konischen Förderabschnitt (143) versehen ist, der dichtend in die Öffnung einzusetzen ist, um die aus der Flasche austretende Behandlungsflüssigkeit direkt in das Innere des Sammelverteilers (14) zu befördern und dadurch einen bevorzugten Weg zum Auslassen der Flüssigkeit in dem Verteiler zu erzeugen.

2. Spülmaschine (1) nach Anspruch 1, wobei der Manipulator (12) eine Flaschenzentrierachse (X) definiert, die bei Gebrauch mit der Mittelachse der Flasche (C) ausgerichtet ist, die durch die Öffnung (B) verläuft, und wobei die Bewegungsmittel (16) des Verteilers (14) umfassen:

- einen ersten Mechanismus (161), der konfiguriert ist, den Verteiler (14) kinematisch integral mit dem Manipulator (12) zumindest für alle Positionen zu machen, die der Manipulator (12) selbst zwischen der Arbeitsposition und der vorbestimmten Zwischenposition einnimmt, an welcher der konische Förderabschnitt (143) des ringförmigen Dichtungskörpers (142) axial mit der Flaschenzentrierachse (X) des Manipulators (12) ausgerichtet ist; und
- einen zweiten Mechanismus (162), der konfiguriert ist, den ringförmigen Dichtungskörper (142) axial zu dem Manipulator (12) zu drücken, um den konischen Förderabschnitt (143) in Anlage gegen die Öffnung (B) zu bringen.

3. Spülmaschine (1) nach Anspruch 1 oder 2, wobei der Verteiler (14) einen Hauptrohrkörper (144) und einen Sekundärrohrkörper (145) umfasst, der axial schwimmend bzw. variabel an bzw. auf dem Hauptrohrkörper (144) montiert ist und der den ringförmigen Dichtungskörper (142) stützt bzw. trägt.

4. Spülmaschine (1) nach Anspruch 2 oder 3, wobei der Flaschenmanipulator (12) und der Verteiler (14) beide um eine gleiche Drehachse (Y) drehbar mit der Befestigungsstruktur (11) verbunden sind und wobei der erste Mechanismus einen ersten Führungsnocken (161) umfasst, der mit dem Manipulator (12) integral in Drehung bzw. integral drehbar ist und kinematisch durch den Verteiler (14) in Eingriff genommen ist, um ihn auf geführte Weise zu bewegen und die Drehbewegung des Manipulators (12) auf ihn zu übertragen, wobei der erste Führungsnocken (161) aufweist:

- eine Umfangsbogensektion (161') konzentrisch zu der Drehachse (Y), entlang derer der Verteiler (14) kinematisch von der Drehung des Manipulators (12) entkoppelt ist, und
- eine gerade Sektion (161''), die sich radial in Bezug auf die Drehachse (Y) parallel zu der Zentrierachse (X) erstreckt und entlang derer der Verteiler (14) kinematisch mit der Drehung des Manipulators (12) gekoppelt ist.

5. Spülmaschine (1) nach Anspruch 4, wobei der Verbindungspunkt zwischen der Umfangsbogensektion (161') und der geraden Sektion (161'') des ersten Führungsnockens (161a) die vorbestimmte Zwischenposition definiert.

6. Spülmaschine (1) nach Anspruch 3, 4 oder 5, wobei der zweite Mechanismus (162) elastische Mittel umfasst, die zwischen dem Hauptrohrkörper (144) und dem Sekundärrohrkörper (145) des Verteilers (14) angeordnet und konfiguriert sind, einen axialen Schub auf den Sekundärrohrkörper (145) und auf den zugehörigen ringförmigen Dichtungskörper (142) in Bezug auf den Hauptrohrkörper (144) auszuüben.

7. Spülmaschine (1) nach einem der Ansprüche 4 bis 6, wobei die Bewegungsmittel (16) des Verteilers (14) einen zweiten Führungsnocken (163) umfassen, der mit der Befestigungsstruktur (11) integral ist und durch den Hauptrohrkörper (144) in Eingriff genommen ist, wobei der zweite Führungsnocken (163) dahingehend geformt ist, die Drehbewegung des Verteilers (14) um die Drehachse (Y) zu führen.

8. Spülmaschine (1) nach einem der vorhergehenden Ansprüche, wobei die Saugmittel (15) eine Mehrzahl von Sauglöchern (151) umfassen, die fluidisch mit einer Saugkammer (152) verbunden sind und an dem ringförmigen Dichtungskörper (142) rund um den konischen Förderabschnitt (143) in einer Position derart erhalten bzw. ausgebildet sind, dass sie bei Gebrauch zumindest teilweise der Innenseite der Öffnung der Flasche zugewandt sind, und wobei die Saugmittel (15) durch Verbinden der Saugkammer

- (152) mit einer Vakuumquelle aktiviert werden können, um durch die Sauglöcher (151) Restbehandlungsflüssigkeit (R) abzusaugen, die sich eventuell zwischen dem Inneren der Öffnung (B) und dem konischen Förderabschnitt (143) angesammelt hat. 5
9. Spülmaschine (1) nach Anspruch 8, wobei der ringförmige Dichtungskörper (142) einen ringförmigen Sammelkanal (147) begrenzt, der sich konzentrisch zu dem konischen Förderabschnitt (143) außerhalb der Mehrzahl von Sauglöchern (151) erstreckt und geeignet ist, jegliche Restbehandlungsflüssigkeit zu sammeln, die nicht von der Mehrzahl von Sauglöchern (151) abgesaugt wird, und wobei die Saugmittel (15) zumindest ein Auslassloch (153) umfassen, das an dem Boden des ringförmigen Sammelkanals (147) erhalten bzw. ausgebildet ist und fluidisch mit der Saugkammer (152) verbunden ist. 10
10. Spülmaschine (1) nach Anspruch 3 oder Ansprüchen 4 bis 9 bei Abhängigkeit von Anspruch 3, wobei der ringförmige Dichtungskörper (142) abnehmbar mit dem Sekundärrohrkörper (145) des Verteilers (14) verbunden ist. 20
11. Spülmaschine (1) nach einem der vorhergehenden Ansprüche, wobei die Einspritzdüse (13) an der Befestigungsstruktur (11) fixiert bzw. befestigt ist und sich in der Länge erstreckt, bis sie die Innenseite bzw. das Innere des Verteilers (14) erreicht. 25
12. Spülmaschine (1) nach Anspruch 11, wobei der Verteiler (14) einen Schlitz (148) aufweist, um den freien Durchgang der Einspritzdüse (13) und damit Relativbewegungen zwischen Düse (13) und Verteiler (14) zu ermöglichen. 30
13. Spülmaschine (1) nach einem der vorhergehenden Ansprüche, wobei die Spülmaschine (1) eine Mehrfachmaschine vom Rotationstyp ist und wobei die Trägerstruktur (2) aus einem Revolver bzw. einer Drehvorrichtung besteht, der bzw. die um eine Maschinenrotationsachse (A) rotiert, wobei die Mittel (3) zum Bewegen und Bedienen von Greifern einen Greiferbewegungs- und -führungsnocken (3) umfassen, der sich um die rotierende Drehvorrichtung erstreckt und drehfest ist und mit dem jeder Spülgreifer (10) kinematisch verbunden ist, um während der Rotationsbewegung der Drehvorrichtung als eine Funktion bzw. in Abhängigkeit von der um die Maschinenrotationsachse (A) eingenommenen Winkelposition geführt und bedient zu werden, wobei der Greiferbewegungs- und -führungsnocken (3) vorzugsweise mit dem Flaschenmanipulator (12) jedes Greifers (10) kinematisch verbunden ist. 35
14. Verfahren zum Spülen einer Flasche mittels einer Spülmaschine (1) nach einem der vorhergehenden 40

Ansprüche, umfassend die folgenden Bedienschritte:

- a) Bereitstellen einer Spülmaschine (1) nach einem der vorhergehenden Ansprüche;
- b) Ergreifen der zu spülenden Flasche mit der jeweiligen Öffnung nach oben gewandt mittels des Flaschenmanipulators (12) eines Spülgreifers (10) der Maschine (1), wobei sich der Manipulator (12) in der Ruheposition befindet;
- c) Bewegen des Manipulators (12) von der Ruheposition zu der Arbeitsposition, um die Flasche mit der jeweiligen Öffnung nach unten gewandt auszurichten;
- d) Einspritzen der Behandlungsflüssigkeit in das Innere der Flasche mittels der Einspritzdüse (13), wenn sich der Manipulator (12) in der Arbeitsposition befindet;
- e) beim Übergang des Manipulators (12) von der Ruheposition zu der Arbeitsposition, fluidisches Verbinden der Öffnung der Flasche mit der Sammelöffnung (141) des Sammelverteilers (14) am ringförmigen Dichtungskörper (142), Einsetzen des konischen Förderabschnitts (143) in das Innere der Öffnung, um die aus der Flasche austretende Behandlungsflüssigkeit direkt in das Innere des Sammelverteilers (14) zu befördern und dadurch einen bevorzugten Weg zum Auslassen der Flüssigkeit im Verteiler zu erzeugen;
- f) Bewegen des Manipulators (12) von der Arbeitsposition zu der Ruheposition, um die Flasche wieder mit der jeweiligen Öffnung nach oben gewandt auszurichten, fluidisches Trennen der Öffnung der Flasche von der Sammelöffnung (141) des Sammelverteilers (14).
15. Verfahren nach Anspruch 14, umfassend einen Schritt g) des Absaugens jeglicher Restbehandlungsflüssigkeit, die sich zwischen dem konischen Förderabschnitt (143) und dem Inneren der Öffnung angesammelt haben könnte, durch die Mehrzahl von Sauglöchern (151), die an dem ringförmigen Dichtungskörper (142) rund um den konischen Förderabschnitt (143) erhalten bzw. ausgebildet sind. 45
16. Verfahren nach Anspruch 15, wobei der Absaugschritt g) nach dem Einspritzschritt d) ausgeführt wird, vorzugsweise während des Schritts f) des Bewegens des Manipulators (12) von der Arbeitsposition zu der Ruheposition. 50

Revendications

1. Machine de rinçage (1) pour bouteilles comprenant :
- une structure de support (2),

- un ou plusieurs préhenseurs de rinçage (10) reliés à la structure de support (2),
- des moyens (3) pour déplacer et faire fonctionner les préhenseurs (10),

dans laquelle chaque préhenseur de rinçage (10) comprend :

- une structure de fixation (11) ancrée sur la structure de support (2) pour relier le préhenseur de rinçage respectif à la structure de support (2),
- un manipulateur de bouteille (12) qui est configuré pour saisir une bouteille de façon détachable et relié de façon mobile à la structure de fixation (11) pour être déplacé par les moyens (3) pour déplacer et faire fonctionner les préhenseurs (10) entre une position de repos dans laquelle le manipulateur (12) retient la bouteille en l'orientant avec l'ouverture respective vers le haut et une position de travail dans laquelle le manipulateur (12) retient la bouteille en l'orientant avec l'ouverture respective vers le bas,
- une buse d'injection (13) qui est configurée pour injecter un liquide de traitement à l'intérieur d'une bouteille saisie par le manipulateur de bouteille (12) respectif à travers l'ouverture de la bouteille elle-même lorsque le manipulateur (12) est dans la position de travail,
- un collecteur récepteur (14) pour collecter le liquide de traitement qui, après l'injection moyennant la buse (13), quitte la bouteille par gravité,
- des moyens d'aspiration (15) pour aspirer les restes de liquide de traitement restant sur la bouteille,

caractérisée en ce que le collecteur récepteur (14) :

- comprend une ouverture de réception (141) pourvue d'un corps d'étanchéité (142) annulaire où le collecteur récepteur (14) peut être relié de façon fluidique à la bouteille à l'ouverture de celle-ci, et
- est relié de façon mobile à la structure de fixation (11) afin de pouvoir être déplacé de façon coordonnée avec le manipulateur de bouteille (12), par des moyens de déplacement (16),

dans laquelle les moyens de déplacement (16) sont configurés de façon que, lorsque le collecteur récepteur (14) est déplacé, il suit le mouvement du manipulateur (12) au moins pour toutes les positions occupées par le manipulateur (12) lui-même entre la position de travail et une position intermédiaire prédéterminée entre la position de travail et la position de repos tout en restant connecté par une liaison d'écoulement à la bouteille saisie par le manipulateur (12), et dans laquelle le corps d'étanchéité (142)

annulaire est pourvu d'une partie transporteuse (143) conique destinée à être insérée de manière étanche à l'intérieur de l'ouverture afin de transporter le liquide de traitement sortant de l'ouverture directement à l'intérieur du collecteur récepteur (14), créant par cela un chemin préférentiel pour décharger le liquide dans le collecteur récepteur.

2. Machine de rinçage (1) selon la revendication 1, dans laquelle le manipulateur (12) définit un axe de centrage de bouteille (X) qui, lors du fonctionnement, est aligné avec l'axe central de la bouteille (C) passant par l'ouverture (B), et dans laquelle les moyens de déplacement (16) du collecteur récepteur (14) comprennent :

- un premier mécanisme (161) configuré pour intégrer le collecteur récepteur (14) cinématiquement avec le manipulateur (12) au moins pour toutes les positions occupées par le manipulateur (12) lui-même entre la position de travail et la position intermédiaire prédéterminée à laquelle la partie transporteuse (143) conique du corps d'étanchéité (142) annulaire est axialement alignée avec l'axe de centrage de bouteille (X) du manipulateur (12), et
- un deuxième mécanisme (162) configuré pour pousser le corps d'étanchéité (142) annulaire axialement vers le manipulateur (12) pour mettre la partie transporteuse (143) conique en appui contre l'ouverture (B).

3. Machine de rinçage (1) selon la revendication 1 ou 2, dans laquelle le collecteur récepteur (14) comprend un corps tubulaire (144) principal et un deuxième corps tubulaire (145) qui est monté de façon axialement flottante sur le corps tubulaire (144) principal et qui supporte le corps d'étanchéité (142) annulaire.

4. Machine de rinçage (1) selon la revendication 2 ou 3, dans laquelle le manipulateur de bouteille (12) et le collecteur récepteur (14) sont, tous les deux, reliés de façon rotative à la structure de fixation (11) autour d'un même axe de rotation (Y) et dans laquelle le premier mécanisme comprend une première came de guidage (161) qui, en rotation, est solidaire du manipulateur (12) et cinématiquement attaché au collecteur récepteur (14) pour le déplacer de façon guidée, y transmettant le mouvement de rotation du manipulateur (12), la première came de guidage (161) ayant :

- une partie en arc de pourtour (161') concentrique à l'axe de rotation (Y) le long de laquelle le collecteur récepteur (14) est cinématiquement découplée de la rotation du manipulateur (12) et
- une partie droite (161'') s'étendant radialement par rapport à l'axe de rotation (Y) parallèlement

à l'axe de centrage (X) et le long de laquelle le collecteur récepteur (14) est cinématiquement couplé à la rotation du manipulateur (12).

5. Machine de rinçage (1) selon la revendication 4, dans laquelle le point de connexion entre la partie en arc de pourtour (161') et la partie droite (161'') de la première came de guidage (161a) définit la position intermédiaire prédéterminée.
6. Machine de rinçage (1) selon la revendication 3, 4 ou 5, dans laquelle le deuxième mécanisme (162) comprend des moyens élastiques qui sont posés entre le corps tubulaire (144) principal et le corps tubulaire (145) secondaire du collecteur récepteur (14) et sont configurés pour imposer une charge axiale sur le corps tubulaire (145) secondaire et sur le corps d'étanchéité (142) annulaire associé par rapport au corps tubulaire (144) principal.
7. Machine de rinçage (1) selon l'une des revendications 4 à 6, dans laquelle les moyens de déplacement (16) du collecteur récepteur (14) comprennent une deuxième came de guidage (163) qui est solidaire de la structure de fixation (11) et est attachée au corps tubulaire (144) principal, la deuxième came de guidage (163) étant formée pour guider le mouvement de rotation du collecteur récepteur (14) autour de l'axe de rotation (Y).
8. Machine de rinçage (1) selon l'une des revendications précédentes, dans laquelle les moyens d'aspiration (15) comprennent une pluralité de trous d'aspiration (151) qui sont connectés par une liaison d'écoulement à une chambre d'aspiration (152) et sont obtenus sur le corps d'étanchéité (142) annulaire tout autour de la partie transporteuse (143) conique dans une position telle que, en fonctionnement, ils sont au moins partiellement en face de l'intérieur de l'ouverture de la bouteille, et dans laquelle les moyens d'aspiration (15) peuvent être activés en connectant la chambre d'aspiration (152) à une source de vide pour aspirer, à travers les trous d'aspiration (151), du liquide de traitement (R) restant qui s'est peut-être accumulé entre l'intérieur de l'ouverture (B) et la partie transporteuse (143) conique.
9. Machine de rinçage (1) selon la revendication 8, dans laquelle le corps d'étanchéité (142) annulaire délimite un canal collecteur récepteur (147) annulaire qui s'étend de façon concentrique à la partie transporteuse (143) conique à l'extérieur de la pluralité de trous (151) et est adapté pour collecter tout liquide de traitement restant non aspiré par la pluralité de trous d'aspiration (151), et dans laquelle les moyens d'aspiration (15) comprennent au moins un trou de décharge (153) qui est obtenu sur le fond du

canal collecteur récepteur (147) annulaire et est relié par une liaison d'écoulement à la chambre d'aspiration (152).

10. Machine de rinçage (1) selon la revendication 3 ou selon les revendications 4 à 9 si elles dépendent de la revendication 3, dans laquelle le corps d'étanchéité (142) annulaire est associé de façon séparable au deuxième corps tubulaire (145) du collecteur récepteur (14).
11. Machine de rinçage (1) selon l'une des revendications précédentes, dans laquelle la buse d'injection (13) est fixée sur la structure de fixation (11) et s'étend en longueur jusqu'à ce qu'elle atteigne l'intérieur du collecteur récepteur (14).
12. Machine de rinçage (1) selon la revendication 11, dans laquelle le collecteur récepteur (14) a une fente (148) pour permettre le passage libre de la buse d'injection (13) et ainsi des mouvements relatifs entre la buse (13) et le collecteur récepteur (14).
13. Machine de rinçage (1) selon l'une des revendications précédentes, dans laquelle la machine de rinçage (1) est une machine multiple de type rotatif et dans laquelle la structure de support (2) est constituée d'une tourelle tournant autour d'un axe de rotation de machine (A), les moyens (3) pour déplacer et faire fonctionner les préhenseurs comprenant une came de mouvement de préhenseur et de guide (3) qui s'étend autour de la tourelle rotative et est fixée en rotation et à laquelle chaque préhenseur de rinçage (10) est relié de façon cinématique pour être guidé et fait fonctionner pendant le mouvement de rotation de la tourelle en fonction de la position angulaire occupée autour de l'axe de rotation de la machine (A), de préférence, la came de mouvement de préhenseur et de guide (3) étant cinématiquement reliée au manipulateur de bouteille (12) de chaque préhenseur (10).
14. Procédé de rinçage d'une bouteille moyennant une machine de rinçage (1) selon l'une des revendications précédentes, comprenant les étapes de fonctionnement suivantes :
 - a) mettre à disposition une machine de rinçage (1) selon l'une des revendications précédentes ;
 - b) saisir une bouteille à rincer avec l'ouverture respective orientée vers le haut, par le manipulateur de bouteille (12) d'un préhenseur de rinçage (10) de la machine (1), le manipulateur (12) étant en position de repos ;
 - c) déplacer le manipulateur (12) de la position de repos à la position de travail afin d'orienter la bouteille avec l'ouverture respective tournée vers le bas ;

d) injecter le liquide de traitement à l'intérieur de la bouteille moyennant la buse d'injection (13) lorsque le manipulateur (12) est en position de travail ;

e) lors du passage du manipulateur (12) de la position de repos à la position de travail, reliant l'ouverture de la bouteille de façon fluidique à l'ouverture de réception (141) du collecteur récepteur (14) au corps d'étanchéité (142) annulaire, insérer la partie transporteuse (143) conique dans l'ouverture, afin de transporter le liquide de traitement sortant de la bouteille directement dans le collecteur récepteur (14), créant par cela un chemin préférentiel pour décharger le liquide dans le collecteur récepteur ;
f) déplacer le manipulateur (12) de la position de travail à la position de repos, afin d'orienter la bouteille de nouveau avec l'ouverture respective tournée vers le haut, déconnectant l'ouverture de la bouteille de façon fluidique de l'ouverture de réception (141) du collecteur récepteur (14).

15. Procédé selon la revendication 14, comprenant une étape g) d'aspiration de tout liquide de traitement restant qui pourrait s'être accumulé entre la partie transporteuse (143) conique et l'intérieur de l'ouverture, par la pluralité de trous d'aspiration (151) qui sont obtenus sur le corps d'étanchéité (142) annulaire tout autour de la partie transporteuse (143) conique.

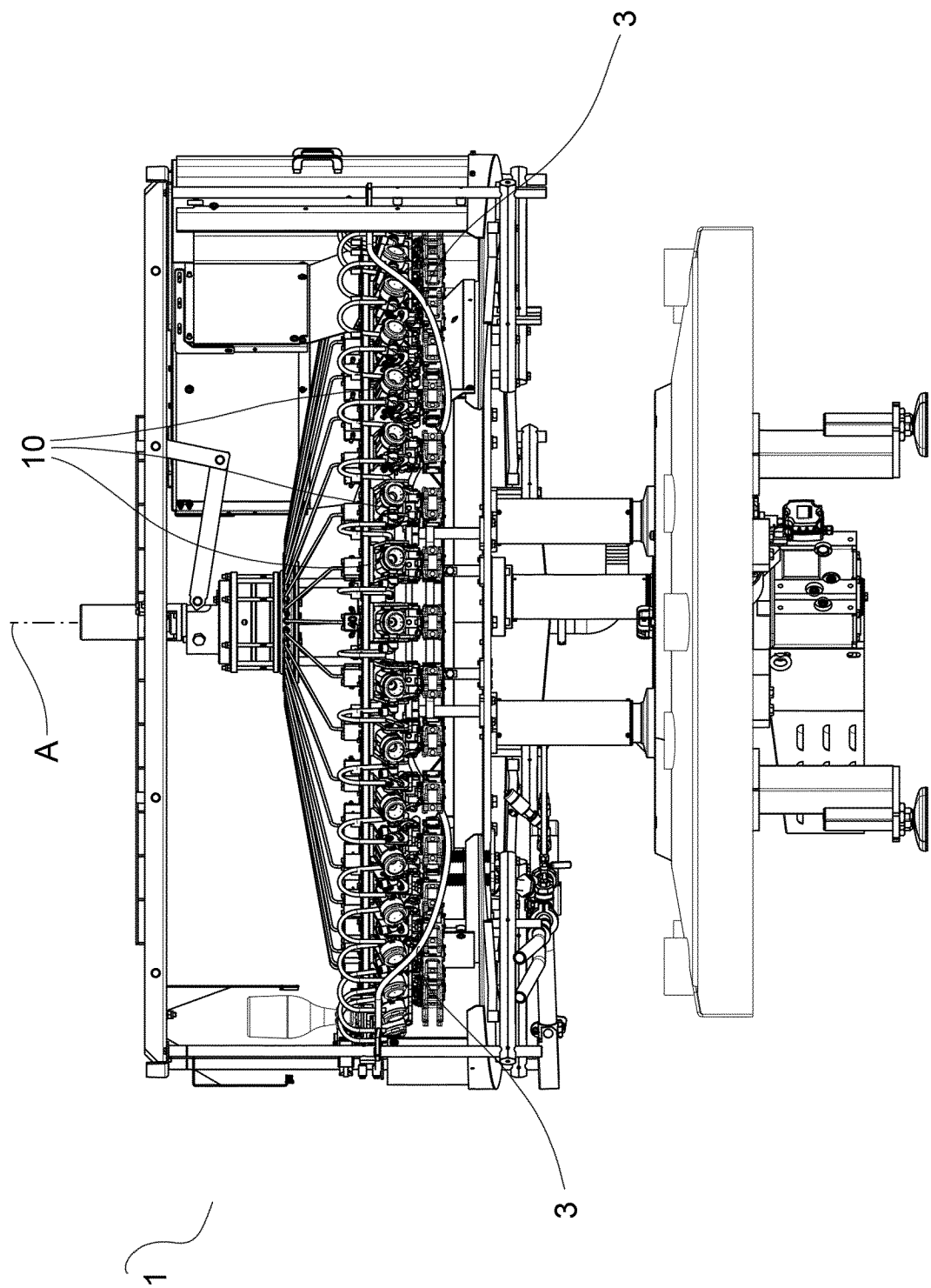
16. Procédé selon la revendication 15, dans lequel l'étape g) d'aspiration est mise en œuvre après l'étape d) d'injection, de préférence pendant l'étape f) de déplacement du manipulateur (12) de la position de travail à la position de repos.

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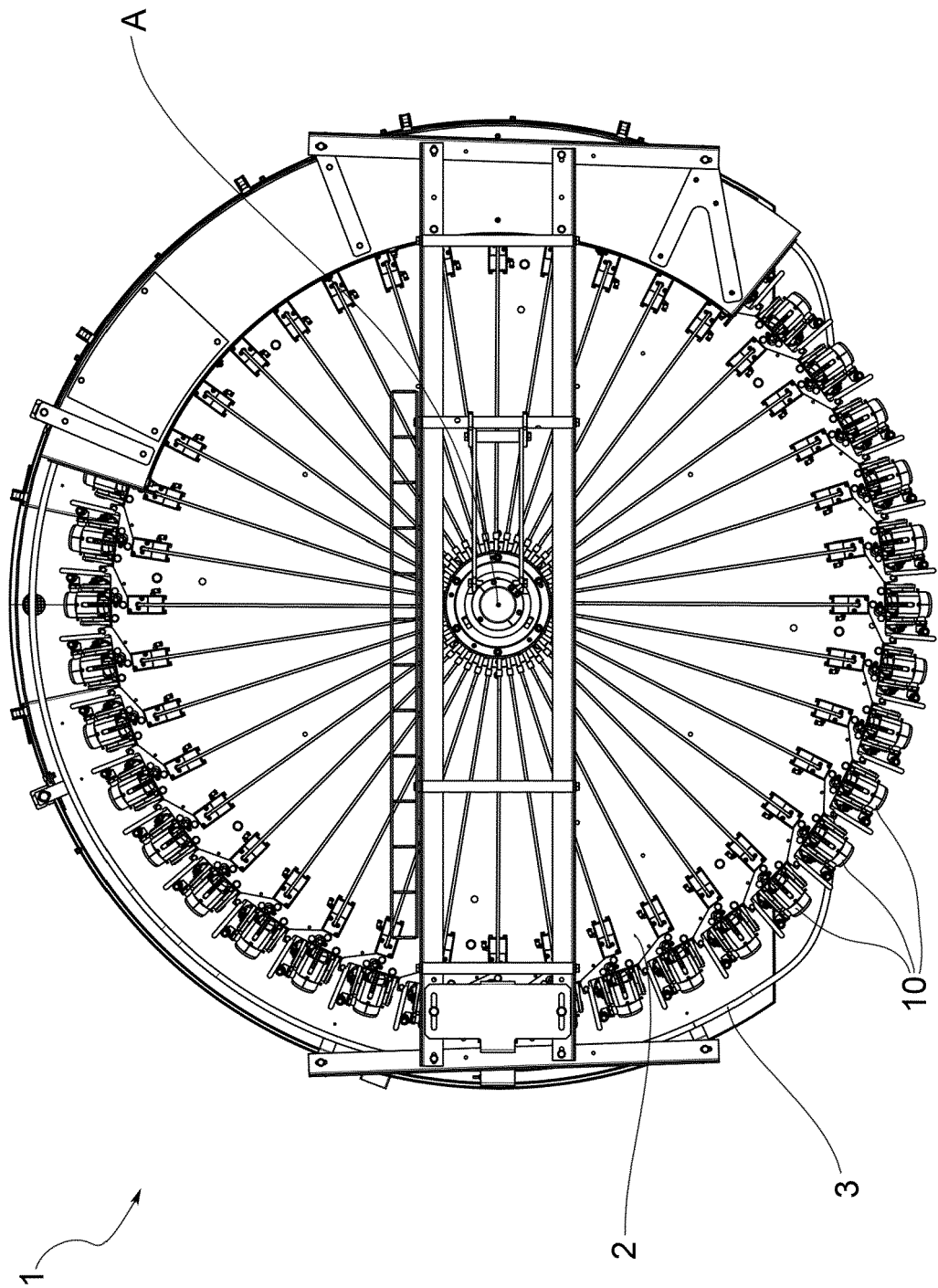


FIG.2

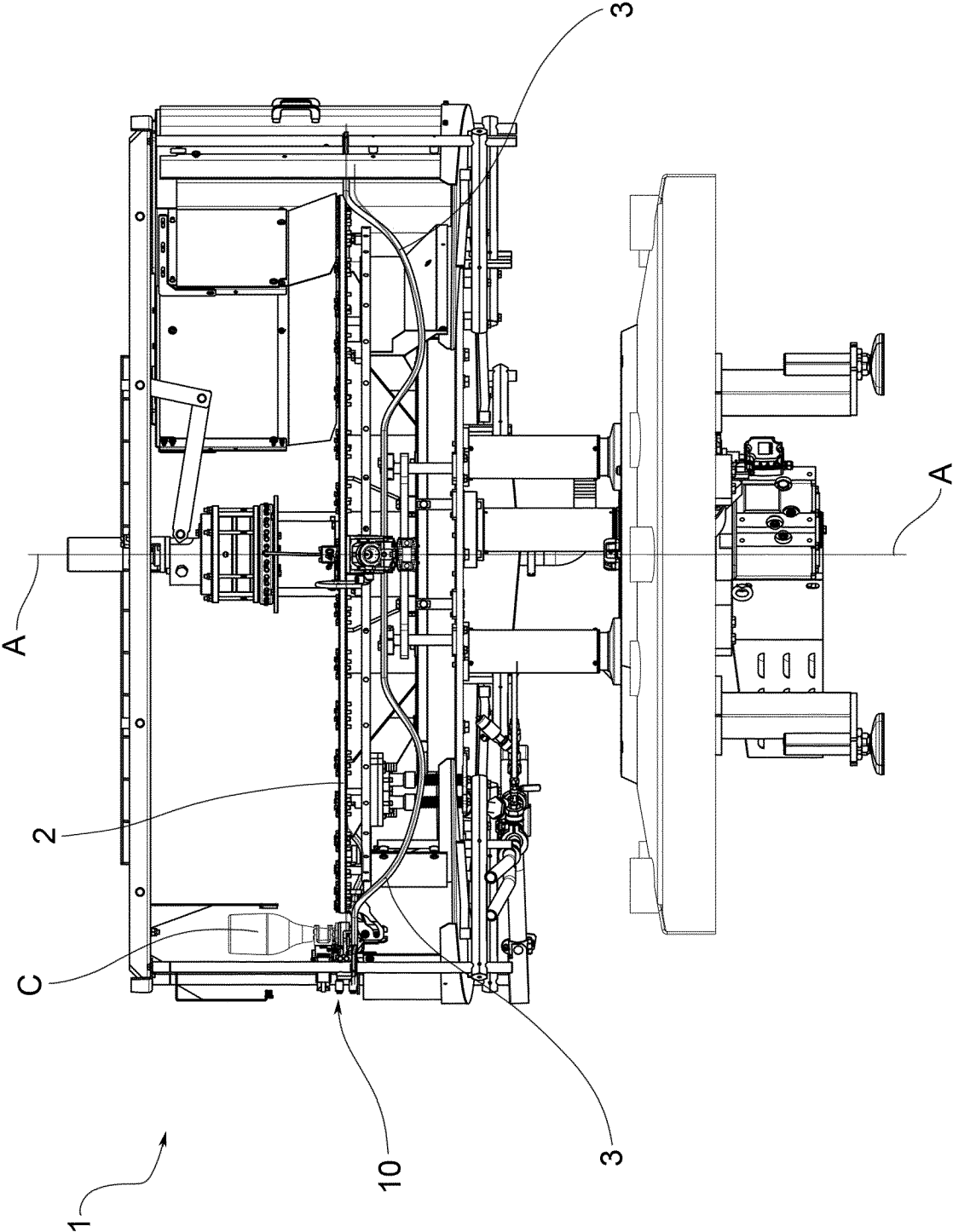


FIG.3

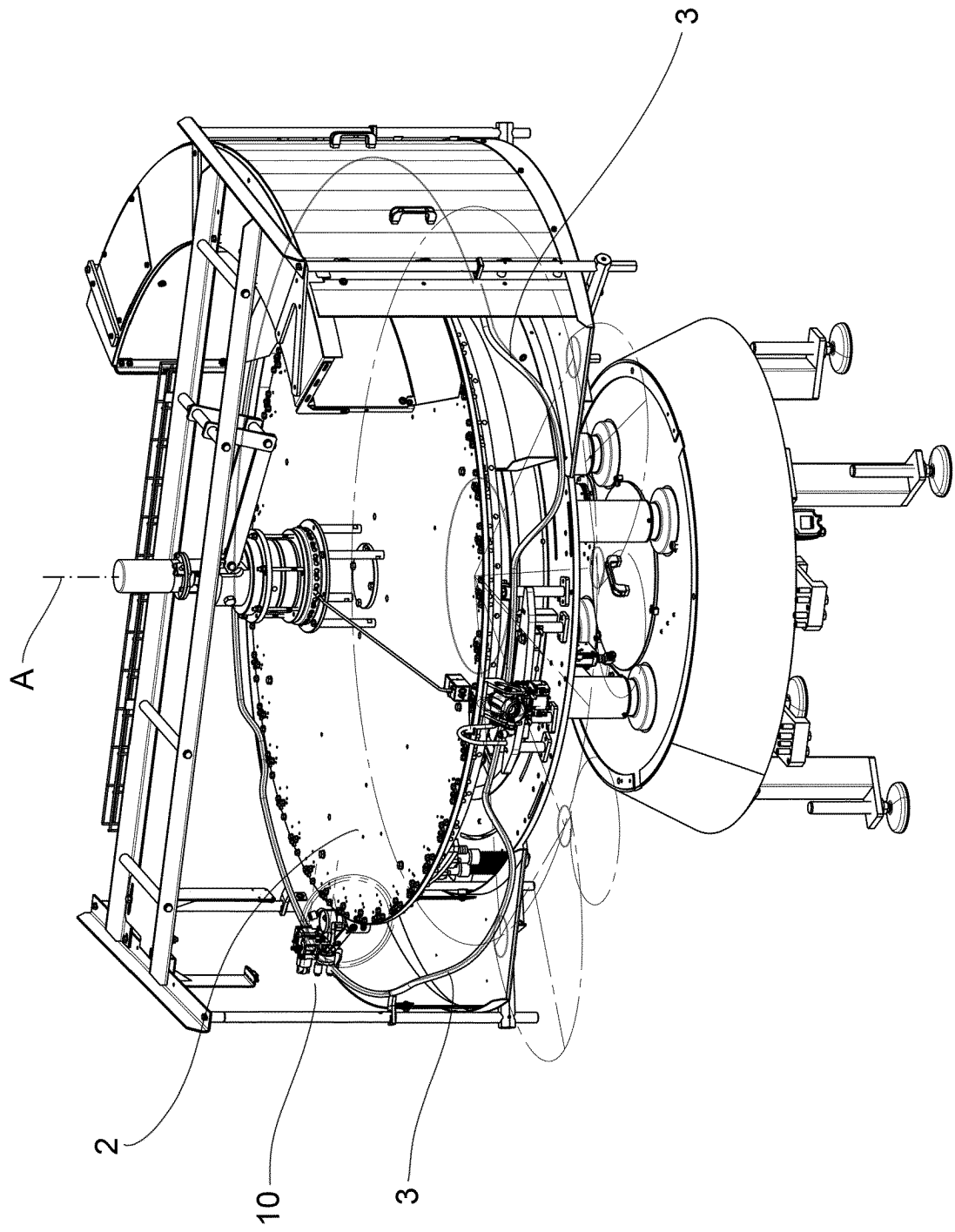


FIG.4

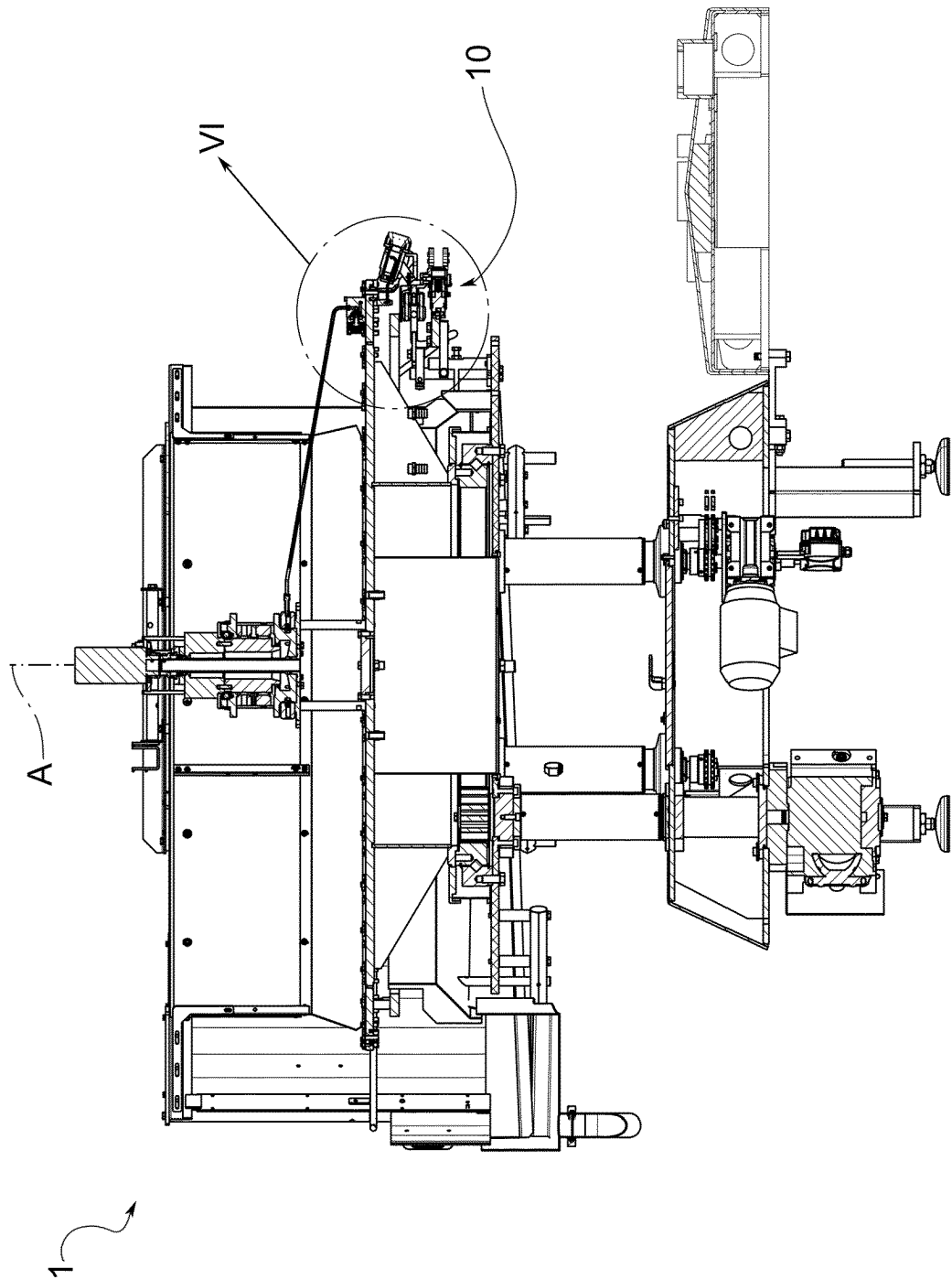


FIG.5

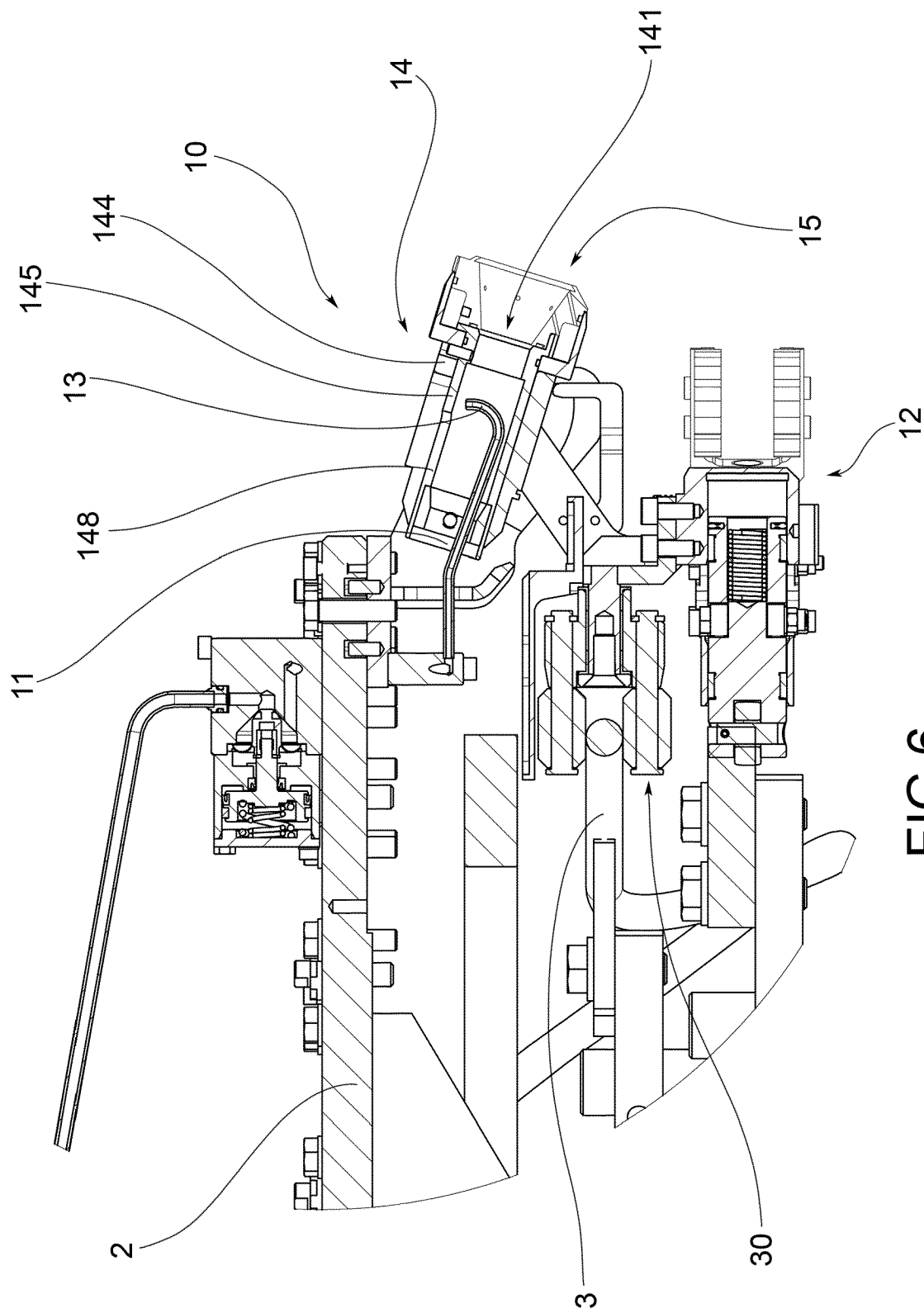


FIG.6

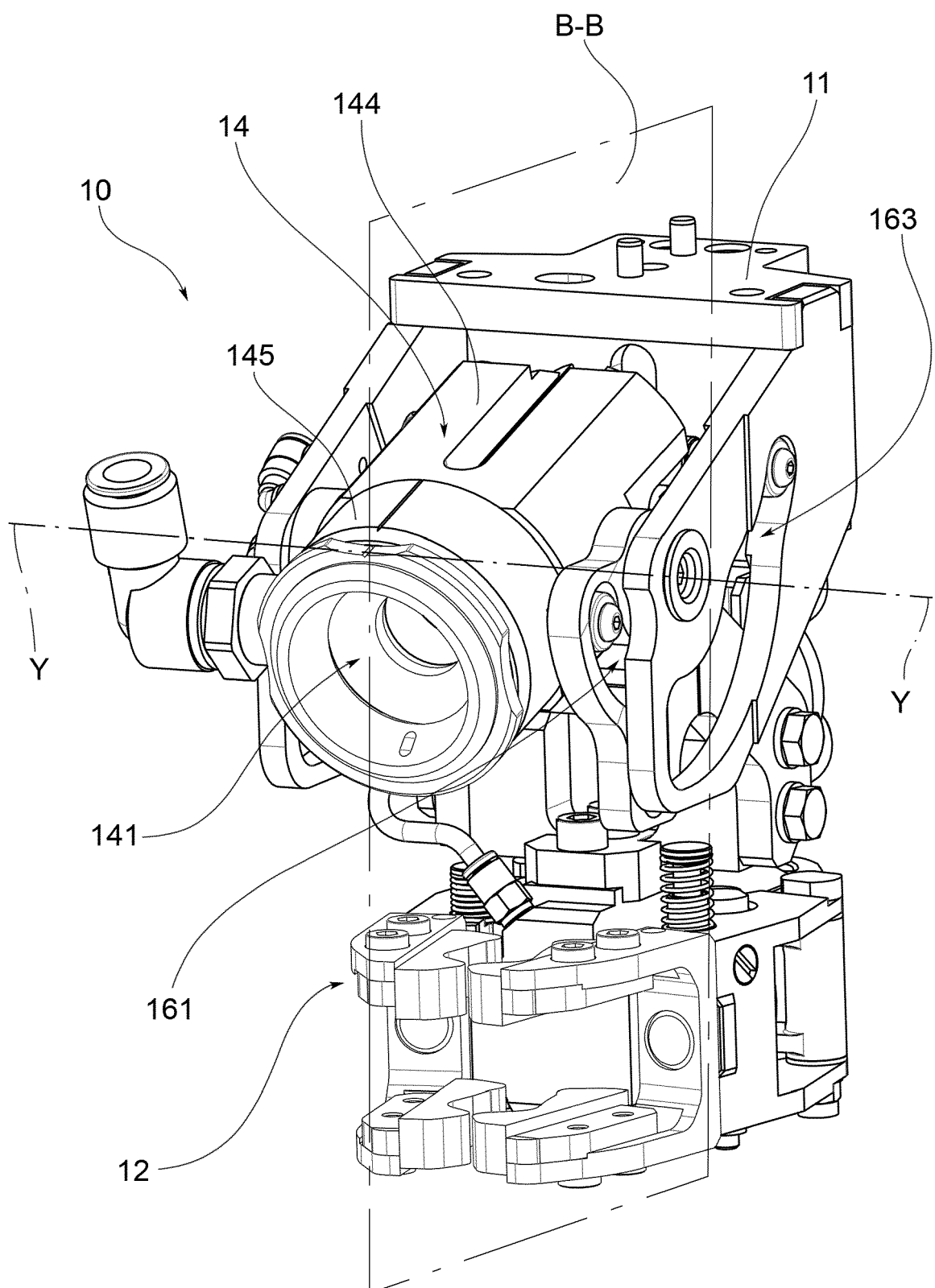


FIG.7

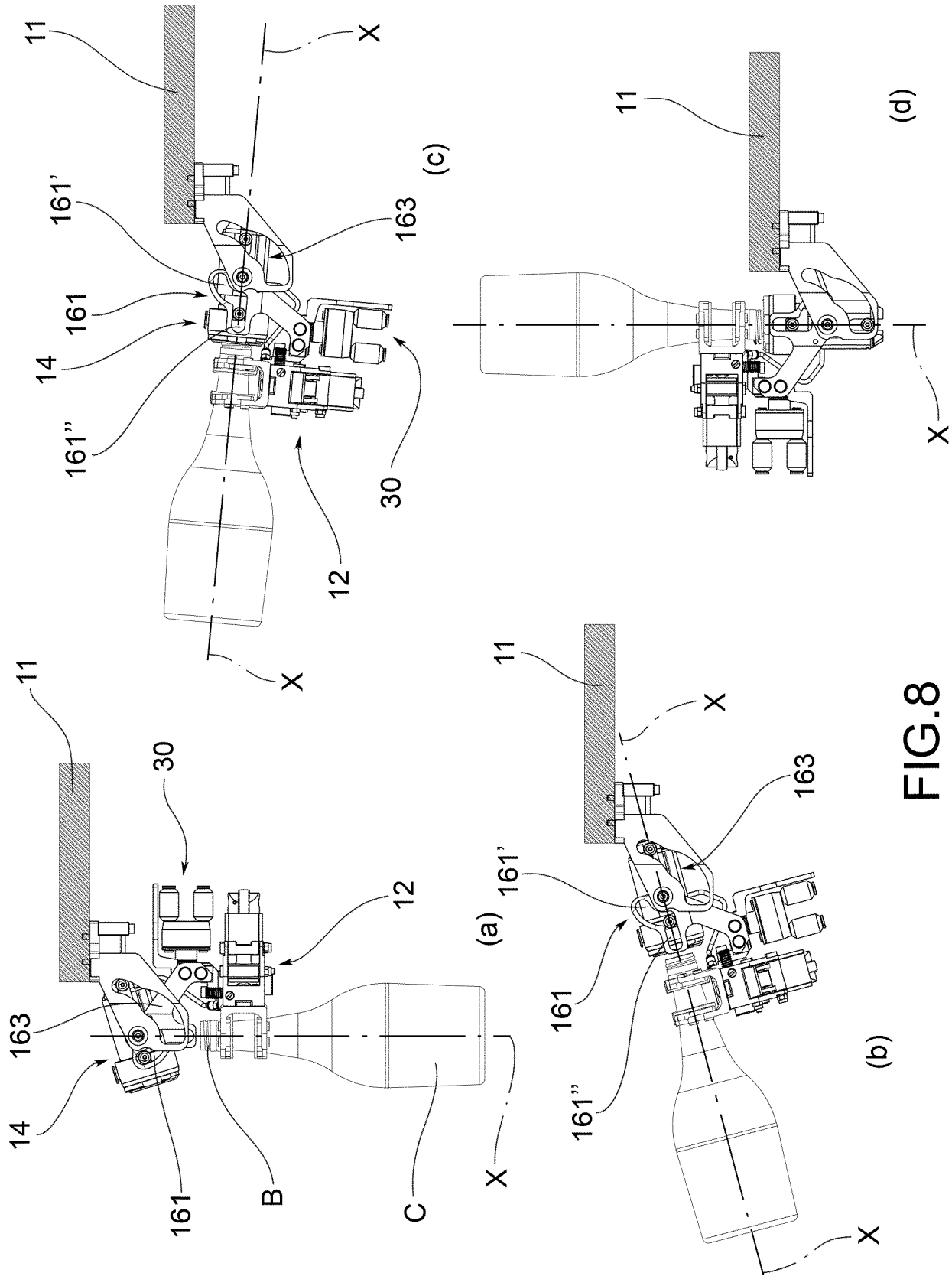


FIG. 8

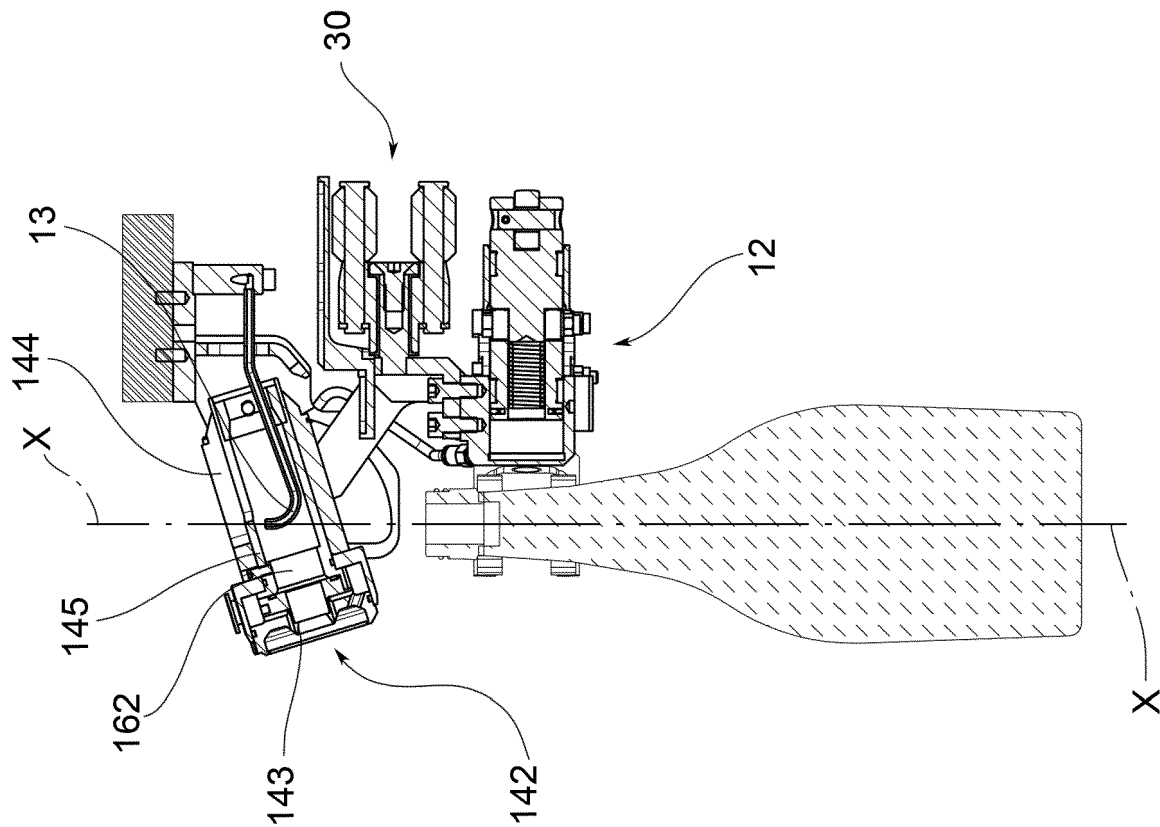


FIG. 8a

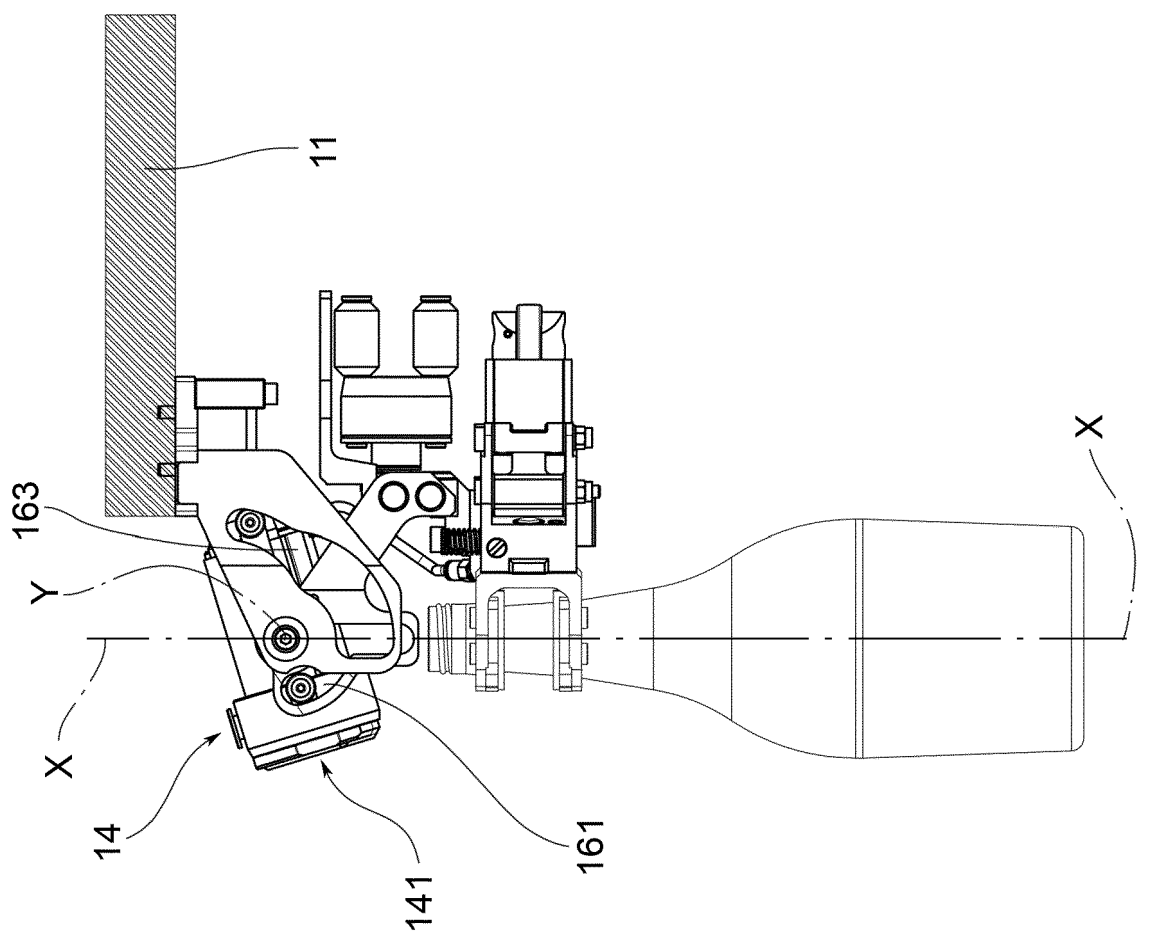


FIG. 8b

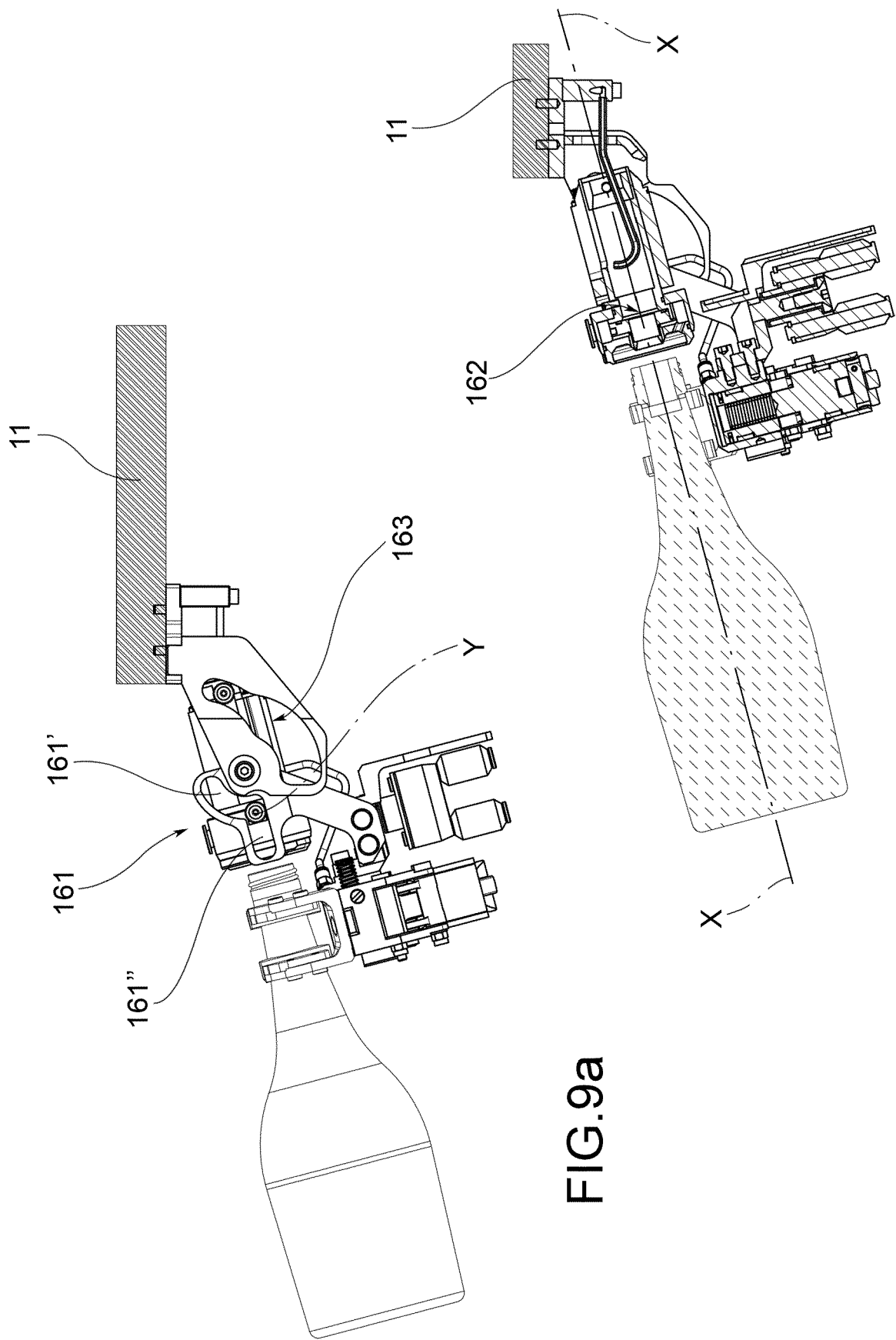


FIG. 9a

FIG. 9b

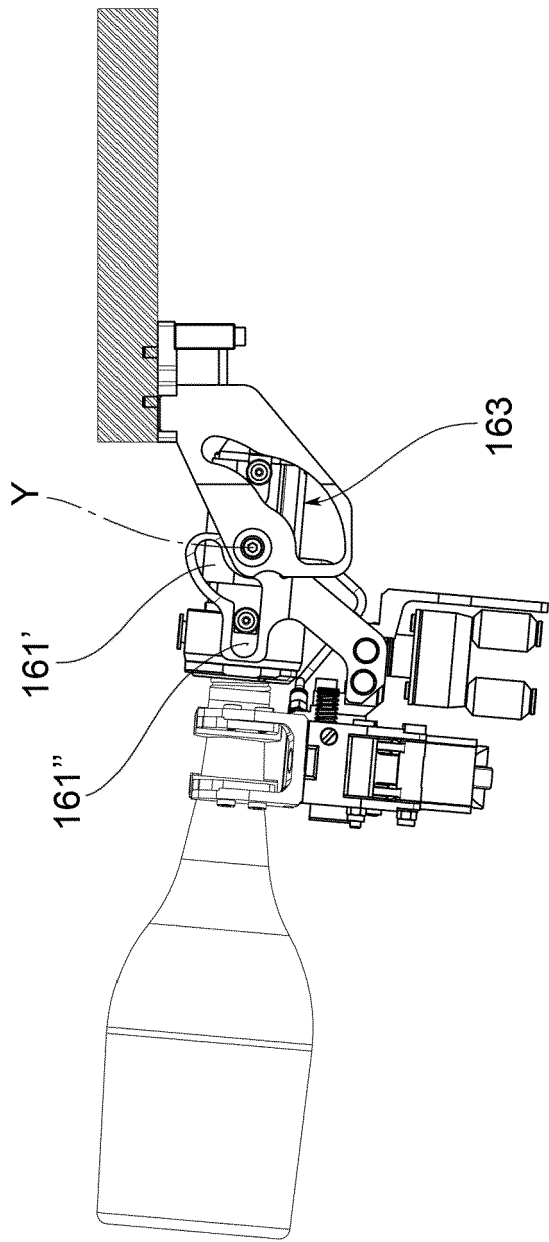


FIG. 10a

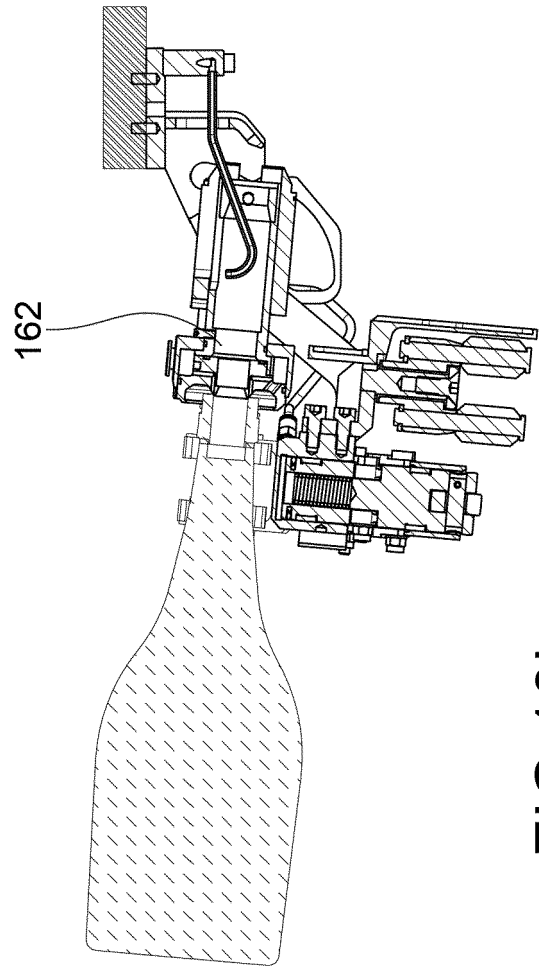


FIG. 10b

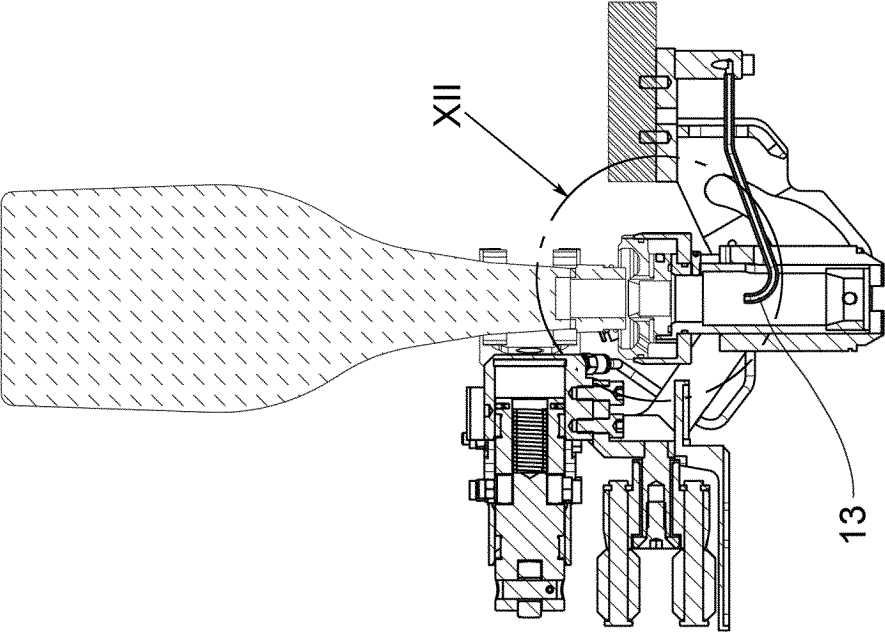
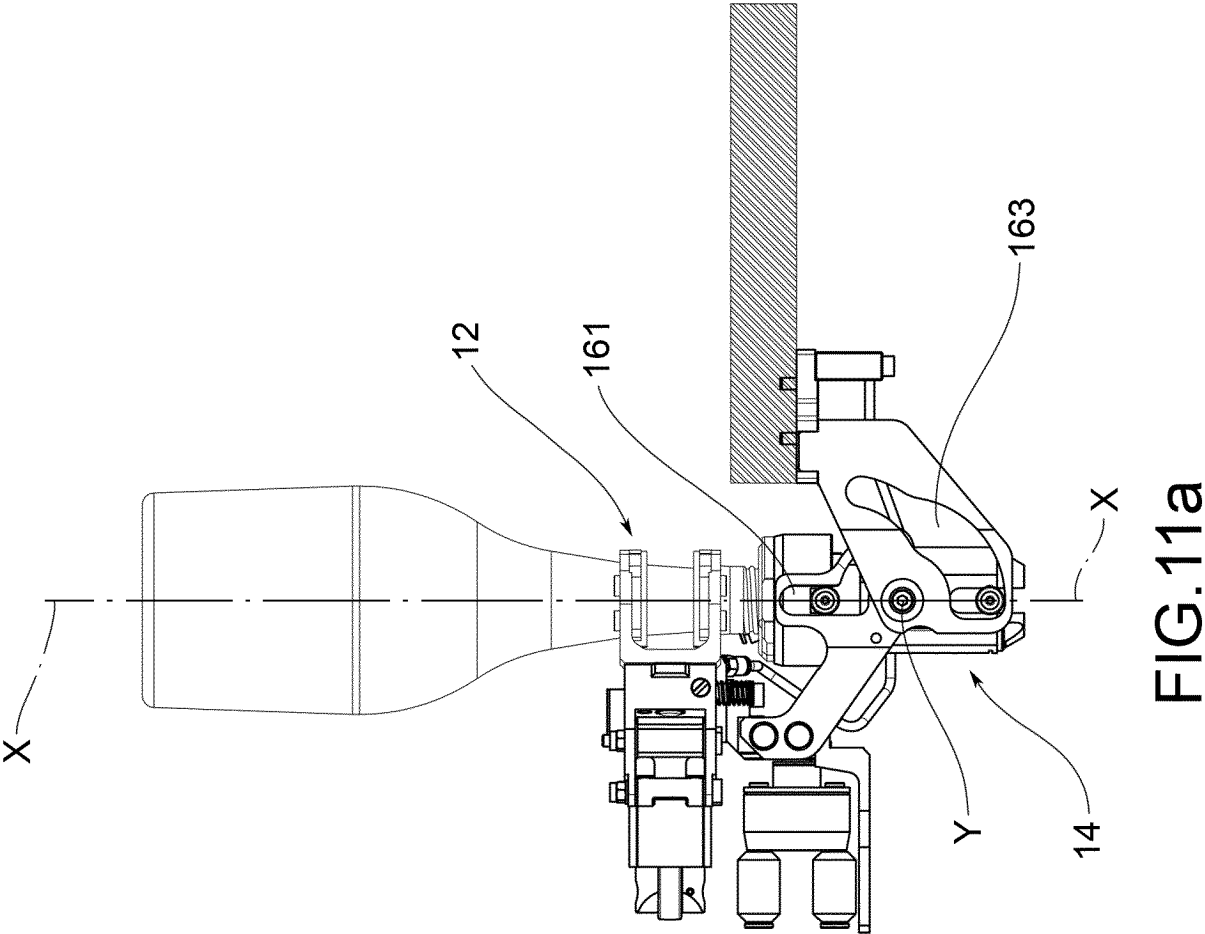


FIG. 11b

FIG. 11a

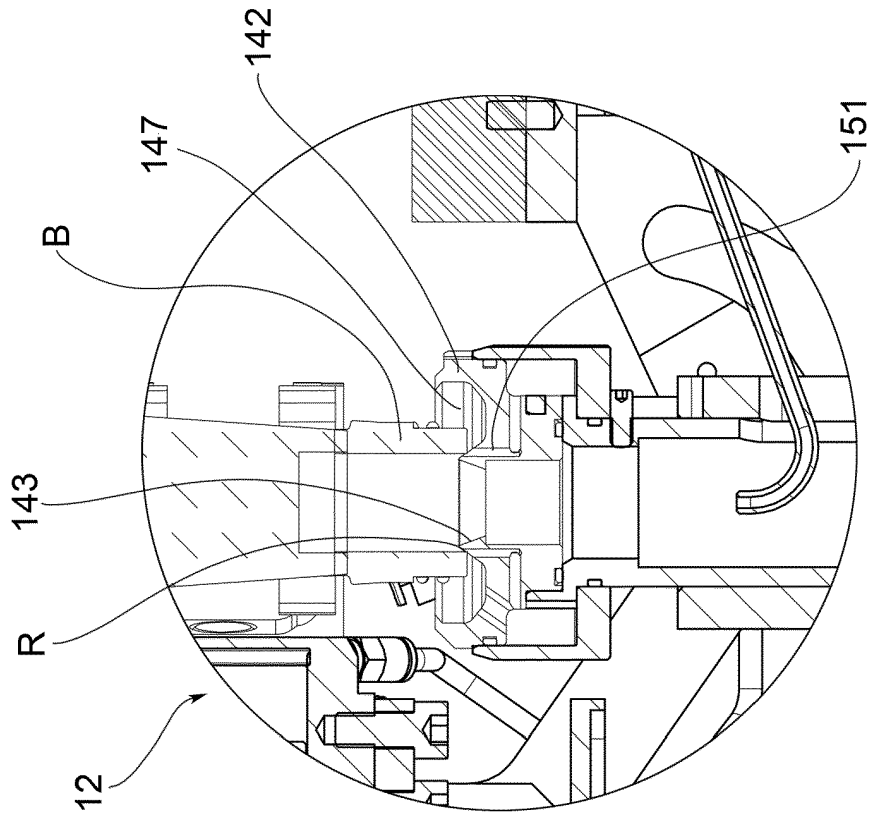


FIG. 12a

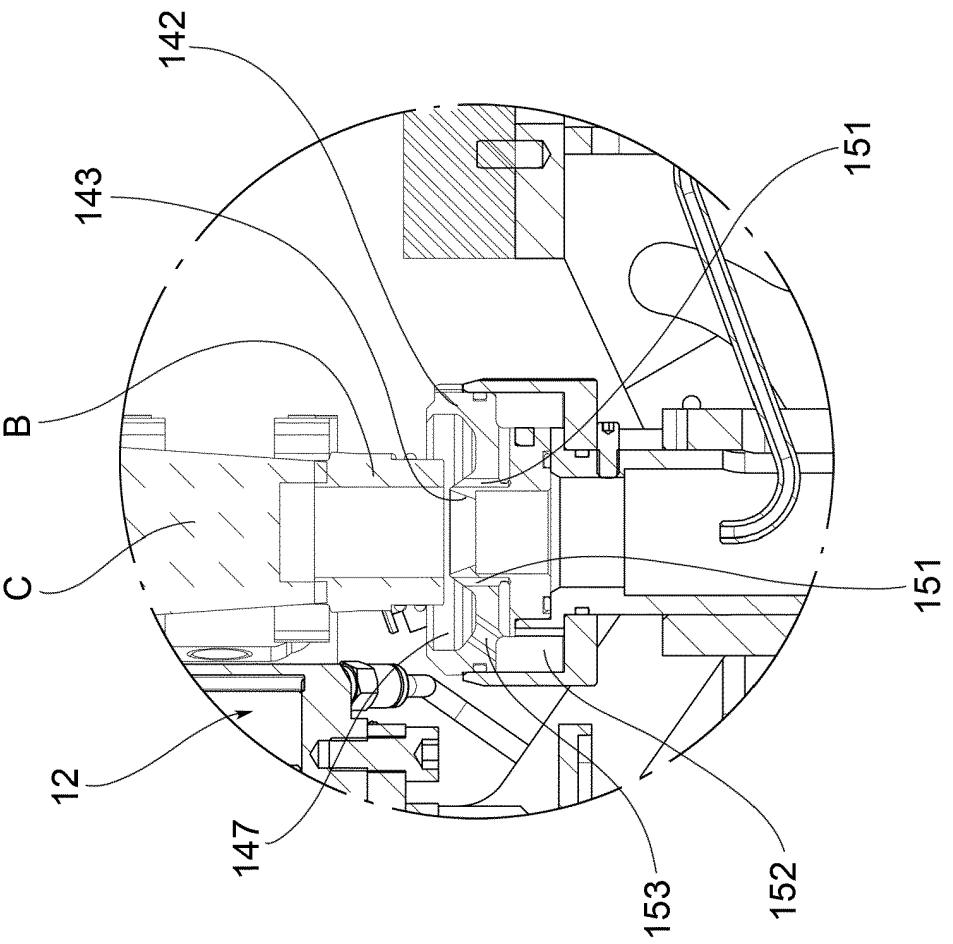


FIG. 12b

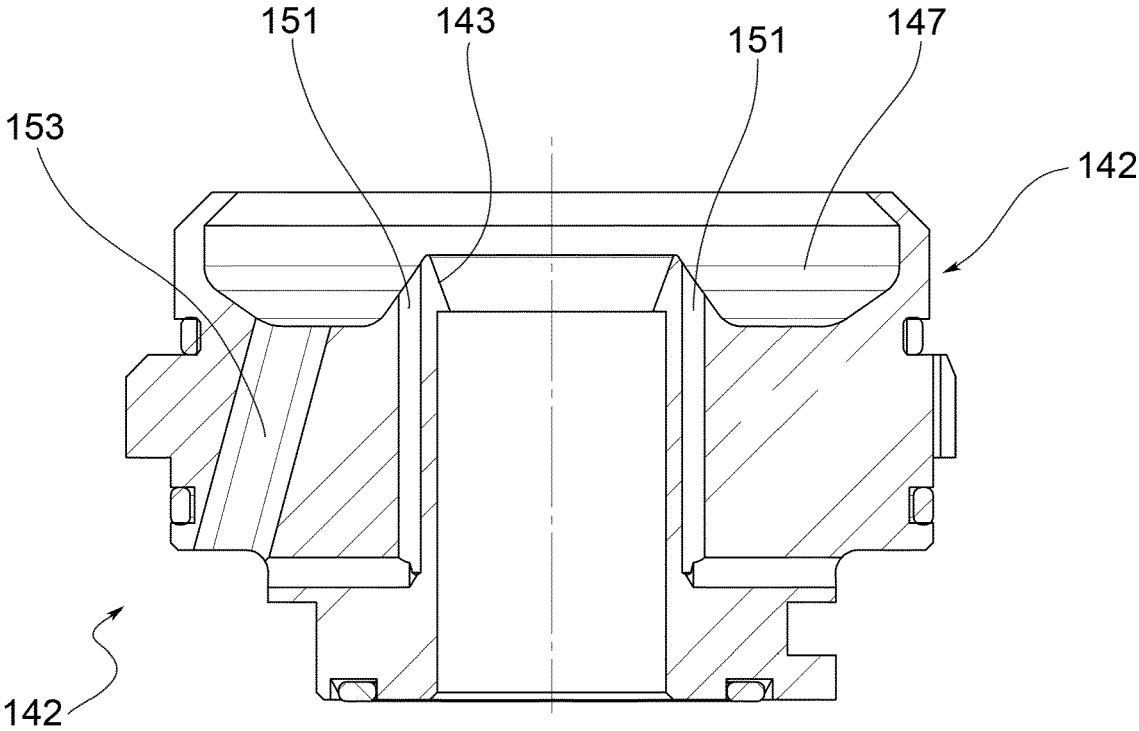


FIG.13

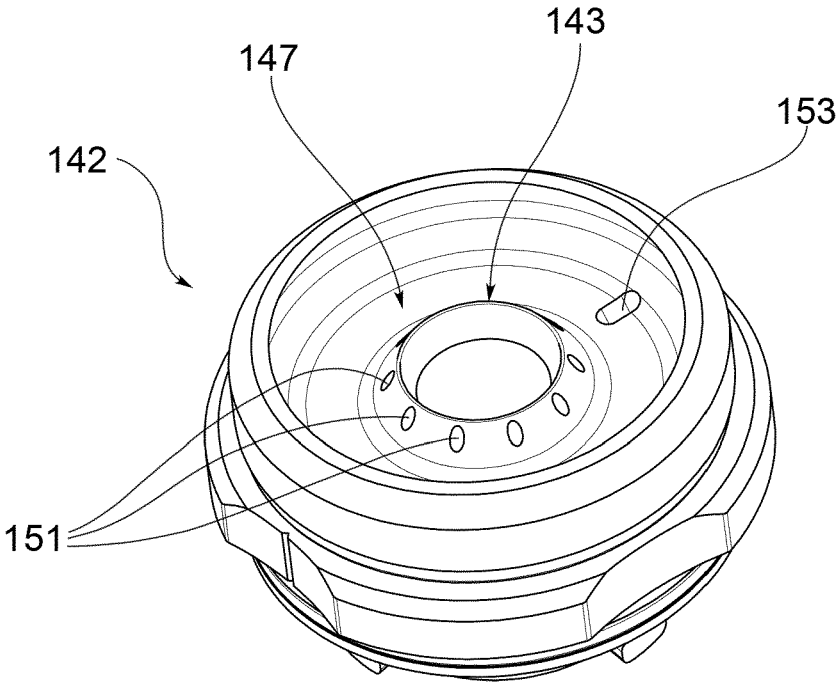


FIG.14

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5277207 A [0011]