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(54) **METHOD FOR LUBRICATING MOLTEN GLASS FORMING MOLDS AND MACHINE USING SUCH MOLDS**

VERFAHREN ZUR SCHMIERUNG VON GIESSFORM FÜR GESCHMOLZENES GLAS UND MASCHINE MIT SOLCHEN FORMEN

PROCÉDÉ DE LUBRIFICATION DE MOULES DE FORMAGE DE VERRE FONDU ET MACHINE UTILISANT DE TELS MOULES

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Description

Field of the invention

[0001] The present invention relates to methods for lubricating forming molds on a glass container forming machine, using lubricating media that can be applied by spraying.

[0002] The present invention also concerns a mechanism suitable to carry out the method as described herein.

Background of the invention and brief description

[0003] Typical methods and machines for lubricating molten glass forming molds are described in the publications US 2003/0221455 A1 and US 2007/0277558 A1 for example.

More specifically, glass forming molds typically comprise two halves, the two mold halves building in a closed position a glass forming mold.

The present invention relates to methods for lubricating glass forming molds where lubricating media circulates through spraying nozzles and the nozzle's supply and return lines for lubricating media.

Residue of lubricating media that remains inside the nozzle following a spraying cycle is preferably blown out of the nozzle through pressurized air. Pressurizing the inside of the nozzle prevents intrusion or entry by foreign particles or gases and cools the nozzle while not spraying.

Preferably, a spraying mechanism is used that is mounted in an alternating left-handed and right-handed version onto each section of an IS machine in order to increase the distance between two neighboring mechanisms. Two adjacent sections of an IS machine are mounted with opposing hands of the spraying mechanism.

[0004] In the present context, the notion of an IS machine is to be understood as relating to a so-called "Individual Section Machine" for forming glass containers, such as bottles, which are known per se in the field of glass container forming, an example being given in the publication WO2008084458. US 4,765,821 discloses an apparatus for lubricating glassware mold.

[0005] EP 2 105 416 discloses glassware manufacturing method and machine.

[0006] The present invention further relates to a method for sucking emissions that are generated by glass forming molds lubricating process.

The method described herein uses a spraying nozzle (one or more spraying nozzles) mounted on a holder which moves into a glass forming mold. The spraying nozzle (one or more spraying nozzles) sprays lubricating media while moving up and/or down in the mold and/or neckrings. One or more spraying nozzles may be mounted on the same holder.

A gas with flame retarding characteristics may be applied as alternative to air for spraying the lubricating media in order to reduce fire hazards and prevent fire related incident

A vacuum is preferably applied in the area where emissions are generated by the lubricating process, allowing the emissions to be sucked. Vacuum nozzles can be mount on the same holder on which mold lubricating nozzles are mounted or on an extra holder for vacuum nozzles. The vacuum nozzle holder can be statically mounted or can be mounted on a mechanism moving the vacuum nozzle holder from a waiting to a working position.

[0007] The invention is especially suitable for:

- Accomplishing consistent mold lubrication in order to improve the quality of production
- Preventing lubricating media from disintegrating while stagnant for too long or while waiting to be sprayed during the lubrication cycle. Circulating lubricating media through the spraying nozzles supply lines can be continuous or intermittent.
- Cooling spraying nozzles by lubricating media circulating through the spraying nozzle supply lines continuously or intermittently and circulating the same way through the spraying nozzle.
- Evacuating residues of lubricating media that remain inside of the nozzle following a spraying cycle which are blown out of the nozzle through pressurized air in order to prevent the jamming or blockage of the nozzle. Pressurizing the inside of the nozzle also prevents intrusion or entry by foreign particles or gases and cools the nozzle while not spraying.

[0008] The invention relates also to a spraying mechanism mounted on the outer blank side of section, onto or next to the blank bracket of an IS machine

- The alternating sequence in mounting the spraying mechanism in left and right handed versions increases the opening distance between two neighboring mechanisms, hence facilitating easier access to the IS machine section for job change, maintenance or repair.

[0009] The invention relates to new methods for sucking gas emissions generated by the mold lubricating process. The invention is especially suitable to accomplish:

- A reduction of unwanted deposits and contamination of the machine. Such deposits consist largely of inflammable matter and thus present a fire hazard.
- To extract fumes that may constitute a health- and/or environmental hazard.

[0010] The present invention provides technical means to,

- continuously circulate the lubricating media in order to avoid jamming or blockage of the nozzle, pump, valves, piping, tank and other system components

and ensure the continuous mixing of the lubricating media media which contains solid particles (graphite)

- Use of left and right handed versions of the spraying mechanism to increase the opening distance between two neighboring mechanisms on an IS machine
- Blow out residual lubricating media and apply pressurized air into the nozzle between spraying cycles to cool nozzle while exhausting through nozzle openings
- Vacuum or suction of emissions generated by the lubricating process, without applying a physical cover over the molds and without interfering with the gob loading path
- Use a flame retarding gas instead of normal air for the spraying action, in order to avoid the hazard of fire after the spraying.

[0011] In one embodiment, the invention concerns a method for the lubrication of glass forming molds with at least a nozzle spraying a lubricating media in the molds, wherein the method comprises at least the following steps:

-) displacement of a nozzle from a resting position to a working position into said mold;
-) movement of said nozzle in said mold while spraying with said nozzle a lubricating media to lubricate the inner surface of said mold;
-) application of vacuum at least during the spraying step to evacuate emissions;
-) once the mold has been lubricated, displacement of the nozzle in a resting position allowing the loading of a gob in said mold;
-) circulation the lubrication media in the nozzle before and after the lubrication step to avoid stagnant lubrication media remaining in the nozzle and/or ensure constant mixing of solid particles in said media.

[0012] In one embodiment, the lubricating media may be sprayed with air under pressure (27).
In one embodiment, the spraying step is executed while moving the nozzle upwards or downwards or in a combination of both directions in the mold. Other movements may be added, for example lateral movements. All movements may be carried out sequentially or in combination.
In one embodiment, a gas with flame retardant characteristics may be used in place of air or in combination with air.
In one embodiment, residues of lubricating media remaining in the nozzle are preferably blown out via air under pressure. The blowing action may also prevent intrusion by foreign particles and further allows a cooling of the nozzle.
[0013] In one embodiment, vacuum is applied also during a gob loading step.
In an embodiment, the present invention concerns a nozzle for the lubrication of glass forming molds, wherein said nozzle comprises at least a supply line and a return line for the lubrication media, a nozzle head with an exhaust for spraying of the lubrication media and a piston that can be moved in a least a first position and in a second position, whereby in the first position the piston closes the nozzle head for the lubricating media so that the media remains in a closed circuit in the nozzle between the supply line and the return line and whereby in the second position, the piston opens the head for the lubricating media so that said media can be sprayed by the nozzle in a mold, said nozzle comprising an air supply for cleaning and cooling of said nozzle.
[0014] In one embodiment, an air supply is preferably used for the spraying operation of the lubricating media.
In one embodiment, the piston is displaced in a first and a second positions by air under pressure.
In one embodiment the invention concerns a spraying mechanism for an IS machine wherein the mechanism comprises at least a nozzle as defined herein.
In one embodiment, the mechanism is left-handed or right handed.
[0015] In one embodiment, the invention concerns an IS machine for forming glass containers, such as bottles, comprises at least a nozzle as defined herein or a spraying mechanism as defined herein and a mold for form a container in accordance with the principles and methods described herein.
[0016] In an embodiment, in the IS machine the spraying mechanisms are left-handed and right handed and mounted in an alternate sequence in each section of the machine to increase the neighboring distance between each spraying mechanism.

Brief description of drawings

[0017]

- Figures 1 through 11 show forming mold lubrication by injection lance, spraying while moving up and/or down.
- Figures 12 and 13 show a schematic of lubricating media supply and return arrangement
- Figures 14 through 24 show where the lubricating mechanism is mount on the machine, a LEFT-HANDED and a RIGHT-HANDED version of mechanism.
- Figures 14 through 24 show the movements of the lubricating mechanisms, LEFT-HANDED and RIGHT-HANDED version, starting from a waiting position and back to waiting position, step by step.
- Description is made on blank molds only. Same working and cooling principle of spraying nozzle can also be applied to lubricate blow molds.
- Concept is shown in a double gob (mold) configuration but same concept can be used in single or multiple gob (mold) configurations.
- External vacuum pump or fan system is not part of

this invention and is not shown in the figures.

- The driving and motion profile of the spraying mechanism is not part of this invention.
- Lubricating media circulating system is not specifically shown in FIGURES 1 to 7. Spraying nozzle is shown schematically in those figures.
- Air supplies to pneumatic cylinder and lubricating media spraying air are shown in detail views of spraying nozzle only.

FIGURE 1. Shows mold lubrication method with lubricating and sucking accessories in waiting position and with forming molds in a cut view taken perpendicularly to the longitudinal axis of the machine.

FIGURE 2. Shows mold lubrication with lubricating nozzles moved on top of forming mold and sucking nozzle moved to working position where emissions generated by the mold lubricating process can be sucked and with forming molds. The cut view is taken in the same plane as figure 1

FIGURE 3. Shows a partial cut view of FIGURE 2 in double gob configuration, in the longitudinal axis of the machine.

FIGURE 4. Shows mold lubrication with the lubricating nozzle moved into the mold and spraying lubricating media. Sucking system is activated.

FIGURE 5. Shows a partial cut view of FIGURE 4. in double gob configuration as figure 3.

FIGURE 6. Shows mold lubrication with lubricating nozzle moved to waiting position, sucking nozzle in working position activated and with a gob bieng loaded into the forming mold.

FIGURE 7. Shows a partial cut view of FIGURE 6. in double gob configuration as in figures 3 and 5.

FIGURE 8. Shows a cross section of spraying nozzle in closed (off) position and media supply to lubricating nozzle and actuating cylinder. Lubricating media circulating system through nozzle assembly shown open.

FIGURE 9. Shows a cross section of spraying nozzle in open (on) position and media supply to lubricating nozzle and actuating cylinder. Lubricating media circulating system through nozzle assembly shown closed.

FIGURE 10. Shows a cross section of spraying nozzle Head in closed (off) position (detail view of FIGURE 8). Lubricating media circulating system through nozzle head shown open.

FIGURE 11. Shows a cross section of spraying nozzle Head in open (on) position (detail view of FIGURE 9). Lubricating media circulating system through nozzle head shown closed.

FIGURE 12. Shows a schematic of lubricating media supply and return arrangement. Spraying is turned off and lubricating media return line is open.

FIGURE 13. Shows a schematic of lubricating media supply and return arrangement. Spraying is turned on and lubricating media return line is closed.

FIGURE 14. Shows a 3D view of an IS machine from the Blank side where spraying mechanisms are mounted

FIGURE 15. Shows a 3D view of an IS machine from opposite the Blank side with spraying mechanisms mount.

FIGURE 16. Shows the IS machine from Blank side with left-handed and right-handed versions of spraying mechanisms mounted.

FIGURE 17. Shows a cross section through blank molds of an IS machine from "inside" with spraying mechanisms mount.

FIGURE 18. Shows a detail view of sections 1+2 with spraying nozzles in waiting position. Spraying, mold lubrication is off.

FIGURE 19. Shows a detail view of sections 3+4 with spraying nozzles moved down vertically between molds. Spraying, mold lubrication is off.

FIGURE 20. Shows a detail view of sections 5+6 with spraying nozzles moved horizontally to the center of closed position of mold halves. Molds are in open position. Spraying, mold lubrication is off.

FIGURE 21. Shows a detail view of sections 7+8 with spraying nozzles moved down vertically deeper between molds and between neck rings. Spraying, mold lubrication is off.

FIGURE 22. Shows a detail view of sections 9+10 with spraying nozzles moved up vertically while spraying and lubricating neck rings and molds.

FIGURE 23. Shows a detail view of sections 11 +12 with spraying nozzles moved horizontally from the center of closed position of mold halves to the horizontal position of waiting position. Molds are in closed position. Spraying, mold lubrication is off.

FIGURE 24. Shows a detail view of sections 13+14 with spraying nozzles moved up vertically to waiting position. Spraying, mold lubrication is off.

Detailed description of the invention

Description of the methods and devices for lubricating molds and sucking emissions (see figures 1 to 11)

[0018] An arm 1 holding one or more spraying nozzles 2 moves on top of a mold 3 from a waiting position, for example as illustrated in figure 1, and is inserted between two mold halves 3a, 3b and/or neck rings 4. These steps are illustrated in figures 2 and 4 where in figure 2 the nozzle 2 is aligned with the mold 3 and in figure 3 the nozzle 2 has been inserted in the mold 3.

[0019] Figure 3 illustrates an embodiment with two molds (so called "double gob" embodiment) to demonstrate that the description with one single mold may be applied to configurations with several molds (i.e. two and more). The position illustrated in figure 3 corresponds to the one illustrated in figure 2 and the description of this figure applies correspondingly.

[0020] In figure 4 specifically, the nozzle 2 sprays lubricating media 5 onto the molds' 6 and necking's 7 inner surfaces while simultaneously moving up and/or down 8 or standing still.

[0021] The lubricating media 5 is fed by an external pumping system through rigid and/or flexible piping 9 and into the spraying nozzle 2. The lubricating media is continuously circulated in the system in order to avoid jams/blockage (nozzle+ pump+ valve + piping + tank etc....) and ensure constant mixing of the lubricating media media which contains solid particles (graphite).

[0022] Figure 5 illustrates the configuration with two molds ("double gob" as in figure 3) and the description of figure 4 applies correspondingly.

[0023] Through a sucking nozzle 10, the emissions 11 generated by the mold lubricating process are sucked by a negative pressure 12 applied in the area where emissions can be sucked or recuperated. The suction 12 is for example generated by an external vacuum pump system or by negative pressure generated by a fan and through rigid and/or flexible piping 13 that connects the vacuum 12 to the sucking nozzle 10. Vacuuming or suction of emissions generated by the lubricating process, are carried out without applying a physical cover over the molds and without interfering with the gob loading path which is more efficient and creates less problems in the process.

[0024] After spraying the lubricating media 5, the arm 1 holding the spraying nozzle 2 moves back into a waiting position for example its initial position of figure 1. The arm 10 containing the sucking nozzle 14 goes into a position that permits gob 15 loading into the mold 3 as illustrated in figure 6. The same arm 10 sucks emissions 11 generated by gob 15 loading process.

[0025] Figure 7 illustrates a front view as figures 3 and 7 in a double gob configuration.

[0026] Once the gob 15 is loaded, the arm 10 containing the vacuum nozzle 14 goes into a waiting position that allows the continuation of the glass forming process, for example as illustrated in figure 1.

[0027] The sucking nozzle 10 may also be fixedly mounted onto the arm 1 holding one or more spraying nozzles 2 and moving with it or they may be independent from each other.

[0028] The sucking nozzle 10 may also be mounted in a fixed manner (for example on the machine or on the mold 3) in a position where emissions 11 can be sucked but is not disturbing continuation of the glass forming process according to the principle of the present invention (see figures 4 and 6 for example).

Description of lubricating media circulating system (figures 8-13)

[0029] Figures 8, 9, 10 and 11 show the functioning of the spraying nozzle 2, figures 8 an d9 being side cut views of the nozzle in two different positions and figures 10 and 11 a detail of the end of the nozzle in said same two positions and the description is given below with reference to figures 12 and 13 as well.

[0030] A pump 16 is pumping lubricating media from a storage tank 17 through a main supply line 18 and through lubricating media section supply line 19 into the spraying nozzles 2 used on the section 36. After the last spraying nozzle 2 on the section 36 the lubricating media 5 flows through a section lubricating media return line 21 and through the main return line 22 back into the lubricating media storage tank 17. Between section supply line 19 and section return line 21 a valve 23 is adapted to open and close the lubricating media return line 21. The valve 23 opens the return line 21 when spraying nozzle 2 is not spraying to allow recuperation of the lubricating media. The valve 23 closes the return line 21 when spraying nozzle 2 is spraying to build up the pressure in the supply line 19 for spraying. Main supply line 18 is under high pressure and main return line 22 is under low pressure.

[0031] A pneumatically actuated piston 24 moves the attached tube 28 in two positions as is now described, one position being illustrated in figures 8/10 and the other in figure 9/11. When the tube 28 is pressed against the fix mounted needle 29, then the supply of lubricating media 5 to the nozzle exhaust 26 is blocked (see figures 8 and 10) and, at the same time, the path of pressurized air 27 to the nozzle exhaust 26 opens as illustrated in Figures 8 and 10. In this situation, the nozzle 2 is deactivated and pressurized air 27 cleans and cools the nozzle exhaust 26, blowing out residual lubricating media 5 in a plenum 30 of the nozzle 2. No lubricating media exits the nozzle and it flows back into return line 21 as illustrated by the arrows in figures 8 and 10.

[0032] When the tube 28 is pressed against nozzle head 32 by the pneumatically actuated piston 24, this situation being illustrated in figures 9 and 11, then the the lubricating media 5 may reach the plenum 30 and may then ejected through the nozzle exhaust 26 and, at the same time, the pressurized air 27 is directed to the

exhaust 26 (see in the right side of figure 11) and, there, it is mixed with the lubricating media 5 and sprayed onto the molds 31 in accordance with the principle of the present invention.

[0033] The piston 24 is actuated for example by air under pressure at inlets/outlets 25a and 25b. When air under pressure arrives through inlet 25a (figure 8), then piston is moved upwards thus closing the passage for the lubricating media (see figure 10) and 25b represents an outlet (see the direction of the arrow).

[0034] When air under pressure arrives at 25b which is used as an inlet, then the piston 24 is moved downwards as in figures 9 and 11, thus liberating the passage for the lubricating media to exit in plenum 30 at exhaust 26 as illustrated in figure 11. In this case, 25a is an outlet as shown by the arrow in figure 9.

[0035] The air under pressure may be delivered by a pump for example or another equivalent device.

[0036] In figures 12 and 13, the representations illustrate a machine with several sections, i.e. molds 3 and corresponding nozzles 2 (see the mentions "Section 01", "Section 02", "Section 03" and "Section nn", "nn" being the last section of the machine and the supply line 19 and return line 21 of figures 8 or 9 have here been referenced 19a, 21a, 19b, 21b, 19c, 21c and 19nn, 21nn. It should be understood that each line 19a-19nn and 21a-21nn corresponds to a line 19, respectively 21 of figures 8 or 9.

[0037] In order to evenly distribute the lubricating media 5 through an operating nozzle 2 at the nozzle exhaust 26 pressurized air 27 is applied for spraying the lubricating media 5 onto the molds 31 as illustrated in figure 11 and discussed above.

Description of how the spraying mechanisms are attached to an IS machine (figures 14-24).

[0038] These figures illustrate several views of an IS machine with a plurality of sections (i.e. fourteen) each being with a double mold 31 (or pair) configuration as in figures 3/5/7 described above. Hence, a pair of molds 31 correspond to the molds 3 of these figures 3/5/7. The molds of sections 1-6 are open and the others of section 7-14 are closed (see in figure 15 for section 6).

[0039] Figure 15 shows a perspective view of the machine of figure 14 from the other side.

[0040] The spraying mechanisms 33a and 33b (one for each pair of molds 31 as illustrated in figures 3/5/7 are mounted on, or next to, a blank bracket 34 of an IS machine 35 section 36, in left-handed and right-handed versions depending on which pair of mold 31 it has to act.

[0041] The IS machine 35 operates multiple sections 36 (1 to 14 in the figures 14 and 15), each having a blank bracket 34 on (or next to) which either a left-handed spraying mechanism 33a or right-handed spraying mechanism 33b is mounted. In figure 15, one see that the end sections ("1" and "14") each only have one single spraying mechanism 33b (section "14") or 33a (section "1").

[0042] Figure 16 is a front view taken from the same side as figure 14 and figure 17 a front view taken from the same side as figure 15.

[0043] Through this assembly method, a wide distance "X" between spraying mechanisms (33) is achieved (Figure 16).

[0044] Figure 16 shows the IS machine from the blank side with left-handed 33a and right-handed 33b versions of spraying mechanisms mounted. Sections with even numbers have a left-handed version of the spraying mechanism 33a mounted on the sections. Uneven numbered sections have a right-hand version 33b of the spraying mechanism mounted. This figure also shows the wide distance "X" between two neighboring lubricating mechanisms when using left-handed and right-handed versions of lubricating mechanisms.

[0045] Figure 17 shows a cross section through blank molds of an IS machine from "inside" with spraying mechanisms mounts. It shows a lubricating cycle step by step. Left-handed 33a and right-handed 33b mechanisms of neighboring sections are in the same working position:

-) sections "1"+ "2", position 1 ("Pos.1" in figure 17) the lubricating mechanisms 33b and 33a are in a high position, for example as illustrated in figures 1 or 2, with open molds 31;
-) sections "3" + "4", position 2 ("Pos.2" in figure 17) the lubricating mechanisms 33b and 33a are in a low position, for example as illustrated in figure 4;
-) sections "5" + "6", position 3 ("Pos.3" in figure 17) the lubricating mechanisms 33b and 33a are in a low position, for example as illustrated in figure 4 but centered in the molds 31 which are still open;
-) sections "7" + "8", position 4 ("Pos.4" in figure 17) the lubricating mechanisms 33b and 33a are in a low position, for example as illustrated in figures 4 or 5but centered in the molds 31, the molds being closed so that the lubricating operation may take place;
-) sections "9" + "10", position 5 ("Pos.5" in figure 17) the lubricating mechanisms 33b and 33a are in a high position, for example as illustrated in figures 2 or 3 but out of the molds 31. Typically this position is reached once the lubricating operation is finished;
-) sections "11" + "12", position 6 ("Pos.6" in figure 17) the lubricating mechanisms 33b and 33a are in a high position and moved to the side, for example as illustrated in figure 1;
-) sections "13" + "14", position 7 ("Pos.7" in figure 17) the lubricating mechanisms 33b and 33a are in a high position and moved to the side, for example as illustrated in figure 6. Typically this position is reached once the lubricating operation is finished and the gobs are going to be loaded into the molds 31.

[0046] Figure 18 shows a detail view of sections "1"+

"2" with spraying nozzles in waiting position. Spraying, mold lubrication is off and this corresponds to the position 2 mentioned above and illustrated in figure 17.
Figure 19 shows a detail view of sections "3" + "4" with spraying nozzles moved down vertically between molds. Spraying, mold lubrication is off and this corresponds to the position 2 mentioned above and illustrated in figure 17.

[0047] Figure 20 shows a detail view of sections "5" + "6" with spraying nozzles moved horizontally to the center of closed position of mold halves. Molds are in open position. Spraying, mold lubrication is off and this corresponds to the position 3 mentioned above and illustrated in figure 17.

[0048] Figure 21 shows a detail view of sections "7" + "8" with spraying nozzles moved down vertically deeper between molds and between neck rings. Spraying and mold lubrication is off this corresponds to the position 4 mentioned above and illustrated in figure 17.

[0049] Figure 22 shows a detail view of sections "9" + "10" with spraying nozzles have been moved up vertically while spraying and lubricating neck rings and molds this corresponds to the position 5 mentioned above and illustrated in figure 17.

[0050] Figure 23 shows a detail view of sections "11" + "12" with spraying nozzles moved horizontally from the center of closed position of mold halves to the horizontal position of waiting position. Molds are in closed position. Spraying, mold lubrication is off this corresponds to the position 6 mentioned above and illustrated in figure 17.

[0051] Figure 24 shows a detail view of sections "13" + "14" with spraying nozzles moved up vertically to a waiting position. Spraying, mold lubrication is off this corresponds to the position 7 mentioned above and illustrated in figure 17.

[0052] Of course, the embodiments given in the present specification are non-limitative illustrative examples and equivalent means are possible within the frame of the present invention. Also, embodiments of the present invention may be combined together and adapted to the circumstances.

Claims

1. A method for the lubrication of glass forming molds (3) with at least a nozzle (2) spraying a lubricating media in the molds, wherein the method comprises at least the following steps:

   -) displacement of a nozzle from a resting position to a working position into said mold (3);
   -) movement of said nozzle in said mold while spraying with said nozzle a lubricating media to lubricate the inner surface of said mold;
   -) application of vacuum at least during the spraying step to evacuate emissions;
   -) once the mold has been lubricated, displacement of the nozzle in a resting position allowing the loading of a gob in said mold;
   -) circulation the lubrication media in the nozzle before and after the lubrication step to avoid stagnant lubrication media remaining in the nozzle and/or ensure constant mixing of solid particles in said media.

2. The method of claim 1, wherein the lubricating media is sprayed with air under pressure (27).

3. The method as defined in one of the preceding claims, wherein the spraying step is executed while moving the nozzle upwards or downwards or in a combination of both directions.

4. The method as defined in one of the preceding claims, wherein a gas with flame retardant characteristics is used in place of air or in combination with air.

5. The method as defined in one of the preceding claims, wherein residues of lubricating media remaining in the nozzle are blown out via air under pressure, said blowing action also preventing intrusion by foreign particles and allowing a cooling of the nozzle.

6. The method as defined in one of the preceding claims, wherein vacuum is applied also during the gob loading step.

7. A nozzle (2) for the lubrication of glass forming molds (3), wherein said nozzle comprises at least a supply line (19) and a return line (21) for the lubrication media (5), a nozzle head (32) with an exhaust (26) for spraying of the lubrication media (5) and a piston (24) that can be moved in a least a first position and in a second position, whereby in the first position the piston closes the nozzle head (32) for the lubricating media so that the media remains in a closed circuit in the nozzle between the supply line and the return line and whereby in the second position, the piston opens the head for the lubricating media so that said media can be sprayed by the nozzle in a mold, said nozzle further comprising an air supply (27) for cleaning and cooling said nozzle.

8. The nozzle as defined in claim 7, wherein said air supply is used for the spraying operation of the lubricating media.

9. The nozzle as defined in one of claims 7 to 8, wherein the piston is displaced in said first and second positions by air under pressure.

10. A spraying mechanism of an IS machine comprising a nozzle as defined in one of claims 7 to 9.

11. The spraying mechanism as defined in claim 10, wherein said mechanism is left-handed (33a) or right handed (33b).

12. An IS machine for forming glass containers, such as bottles, comprises at least a nozzle (2) as defined in one of claims 7 to 9 or a spraying mechanism as defined in one of claims 10 or 11 and a mold (3).

13. An IS machine as defined in claim 12, wherein said spraying mechanisms are left-handed (33a) and right handed (33b) and mounted in an alternate sequence in each section of the machine to increase the neighboring distance (X) between each spraying mechanism (33a, 33b).

Patentansprüche

1. Verfahren zur Schmierung von Glasgießformen (3) mit mindestens einer Düse (2), die ein Schmiermittel in die Formen sprüht, wobei das Verfahren mindestens die folgenden Schritte umfasst:

-) Verschieben einer Düse aus einer Ruheposition in eine Arbeitsposition in der Form (3);
-) Bewegen der Düse in der Form, während mit der Düse ein Schmiermittel zum Schmieren der Innenfläche der Form gesprüht wird;
-) Anlegen von Vakuum mindestens während des Sprühschritts, um Emissionen abzusaugen;
-) sobald die Form geschmiert worden ist, Verschieben der Düse in eine Ruheposition, um das Laden eines Glaspostens in die Form zuzulassen;
-) Zirkulieren des Schmiermittels in der Düse vor und nach dem Schmierschritt, um zu vermeiden, dass ein stagnierendes Schmiermittel in der Düse zurückbleibt, und bzw. oder ein konstantes Mischen der Feststoffpartikel im Medium sicherzustellen.

2. Verfahren nach Anspruch 1, wobei das Schmiermittel mit Luft unter Druck (27) versprüht wird.

3. Verfahren nach einem der vorhergehenden Ansprüche, wobei der Sprühschritt ausgeführt wird, während die Düse sich auf oder ab oder in einer Kombination der beiden Richtungen bewegt.

4. Verfahren nach einem der vorhergehenden Ansprüche, wobei ein Gas mit flammenhemmenden Eigenschaften anstelle von Luft oder in Kombination mit Luft verwendet wird.

5. Verfahren nach einem der vorhergehenden Ansprüche, wobei Rückstände des Schmiermittels, die in der Düse zurückbleiben, über Luft unter Druck ausgeblasen werden, wobei dieser Blasvorgang ebenfalls das Eindringen von Fremdstoffen verhindert und ein Kühlen der Düse zulässt.

6. Verfahren nach einem der vorhergehenden Ansprüche, wobei Vakuum ebenfalls während des Glaspostenladeschritts angelegt wird.

7. Düse (2) zum Schmieren von Glasgießformen (3), wobei die Düse mindestens eine Zuleitung (19) und eine Rückleitung (21) für das Schmiermittel (5), einen Düsenkopf (32) mit einer Auslassöffnung (26) zum Sprühen des Schmiermittels (5) und einen Kolben (24) umfasst, der in mindestens eine erste Position und in eine zweite Position bewegt werden kann, wobei der Kolben in der ersten Position den Düsenkopf (32) für das Schmiermittel schließt, sodass das Mittel in einem geschlossenen Kreislauf in der Düse zwischen der Zuleitung und der Rückleitung bleibt, und wobei in der zweiten Position der Kolben den Kopf für das Schmiermittel öffnet, sodass das Schmiermittel von der Düse in eine Form gesprüht werden kann, wobei die Düse ferner eine Luftzufuhr (27) zum Reinigen und Kühlen der Düse umfasst.

8. Düse nach Anspruch 7, wobei die Luftzufuhr für den Sprühvorgang des Schmiermittels verwendet wird.

9. Düse nach einem der Ansprüche 7 bis 8, wobei der Kolben durch Luft unter Druck in die erste und zweite Position verschoben wird.

10. Sprühmechanismus einer IS-Maschine, die eine Düse nach einem der Ansprüche 7 bis 9 umfasst.

11. Sprühmechanismus nach Anspruch 10, wobei der Mechanismus linksgängig (33a) oder rechtsgängig (33b) ist.

12. IS-Maschine zum Bilden von Glasbehältern wie Flaschen umfasst mindestens eine Düse (2) nach einem der Ansprüche 7 bis 9 oder einen Sprühmechanismus nach einem der Ansprüche 10 oder 11 und eine Form (3).

13. IS-Maschine nach Anspruch 12, wobei die Sprühmechanismen linksgängig (33a) und rechtsgängig (33b) sind und in abwechselnder Folge in jeder Sektion der Maschine montiert werden, um den benachbarten Abstand (X) zwischen jedem Sprühmechanismus (33a, 33b) zu vergrößern.

Revendications

1. Procédé pour la lubrification de moules à former le verre (3) avec au moins une tuyère (2) pulvérisant

un milieu de lubrification dans les moules, dans lequel le procédé comprend au moins les étapes suivantes :

-) déplacement d'une tuyère d'une position de repos à une position de travail dans ledit moule (3) ;
-) mouvement de ladite tuyère dans ledit moule tout en pulvérisant avec ladite tuyère un milieu de lubrification pour lubrifier la surface intérieure dudit moule ;
-) application d'un vide au moins pendant l'étape de pulvérisation pour évacuer des émissions ;
-) une fois que le moule a été lubrifié, déplacement de la tuyère dans une position de repos permettant le chargement d'une paraison dans ledit moule ;
-) circulation du milieu de lubrification dans la tuyère avant et après l'étape de lubrification pour éviter qu'un milieu de lubrification stagnant reste dans la tuyère et/ou garantir un mélange constant de particules solides dans ledit milieu.

2. Procédé selon la revendication 1, dans lequel le milieu de lubrification est pulvérisé avec de l'air sous pression (27).

3. Procédé selon l'une des revendications précédentes, dans lequel l'étape de pulvérisation est exécutée tout en montant ou en descendant la tuyère ou dans une combinaison des deux directions.

4. Procédé selon l'une des revendications précédentes, dans lequel un gaz avec des caractéristiques d'ignifugation est utilisé à la place de l'air ou en combinaison avec l'air.

5. Procédé selon l'une des revendications précédentes, dans lequel des résidus de milieu de lubrification restant dans la tuyère sont soufflés par l'intermédiaire de l'air sous pression, ladite action de soufflage empêchant également une intrusion par des particules étrangères et permettant un refroidissement de la tuyère.

6. Procédé selon l'une des revendications précédentes, dans lequel un vide est appliqué également pendant l'étape de chargement de paraison.

7. Tuyère (2) pour la lubrification de moules à former le verre (3), dans laquelle ladite tuyère comprend au moins une ligne d'alimentation (19) et une ligne de retour (21) pour le milieu de lubrification (5), une tête de tuyère (32) avec un échappement (26) pour pulvériser le milieu de lubrification (5) et un piston (24) qui peut être mû dans au moins une première position et dans une seconde position, moyennant quoi dans la première position, le piston ferme la tête de tuyère (32) pour le milieu de lubrification de sorte que le milieu reste dans un circuit fermé dans la tuyère entre la ligne d'alimentation et la ligne de retour et moyennant quoi dans la seconde position, le piston ouvre la tête pour le milieu de lubrification de sorte que ledit milieu puisse être pulvérisé par la tuyère dans un moule, ladite tuyère comprenant en outre une alimentation en air (27) pour nettoyer et refroidir ladite tuyère.

8. Tuyère selon la revendication 7, dans laquelle ladite alimentation en air est utilisée pour l'opération de pulvérisation du milieu de lubrification.

9. Tuyère selon l'une des revendications 7 et 8, dans laquelle le piston est déplacé dans lesdites première et seconde positions par de l'air sous pression.

10. Mécanisme de pulvérisation d'une machine IS comprenant une tuyère selon l'une quelconque des revendications 7 à 9.

11. Mécanisme de pulvérisation selon la revendication 10, dans lequel ledit mécanisme a une commande à gauche (33a) ou à droite (33b).

12. Machine à sections pour former des récipients en verre, tels que des bouteilles, comprenant au moins une tuyère (2) selon l'une des revendications 7 à 9 ou un mécanisme de pulvérisation selon l'une des revendications 10 et 11 et un moule (3).

13. Machine à sections selon la revendication 12, dans laquelle lesdits mécanismes de pulvérisation ont une commande à gauche (33a) et à droite (33b) et sont montés dans une séquence alternée dans chaque section de la machine pour augmenter la distance de voisinage (X) entre chaque mécanisme de pulvérisation (33a, 33b).

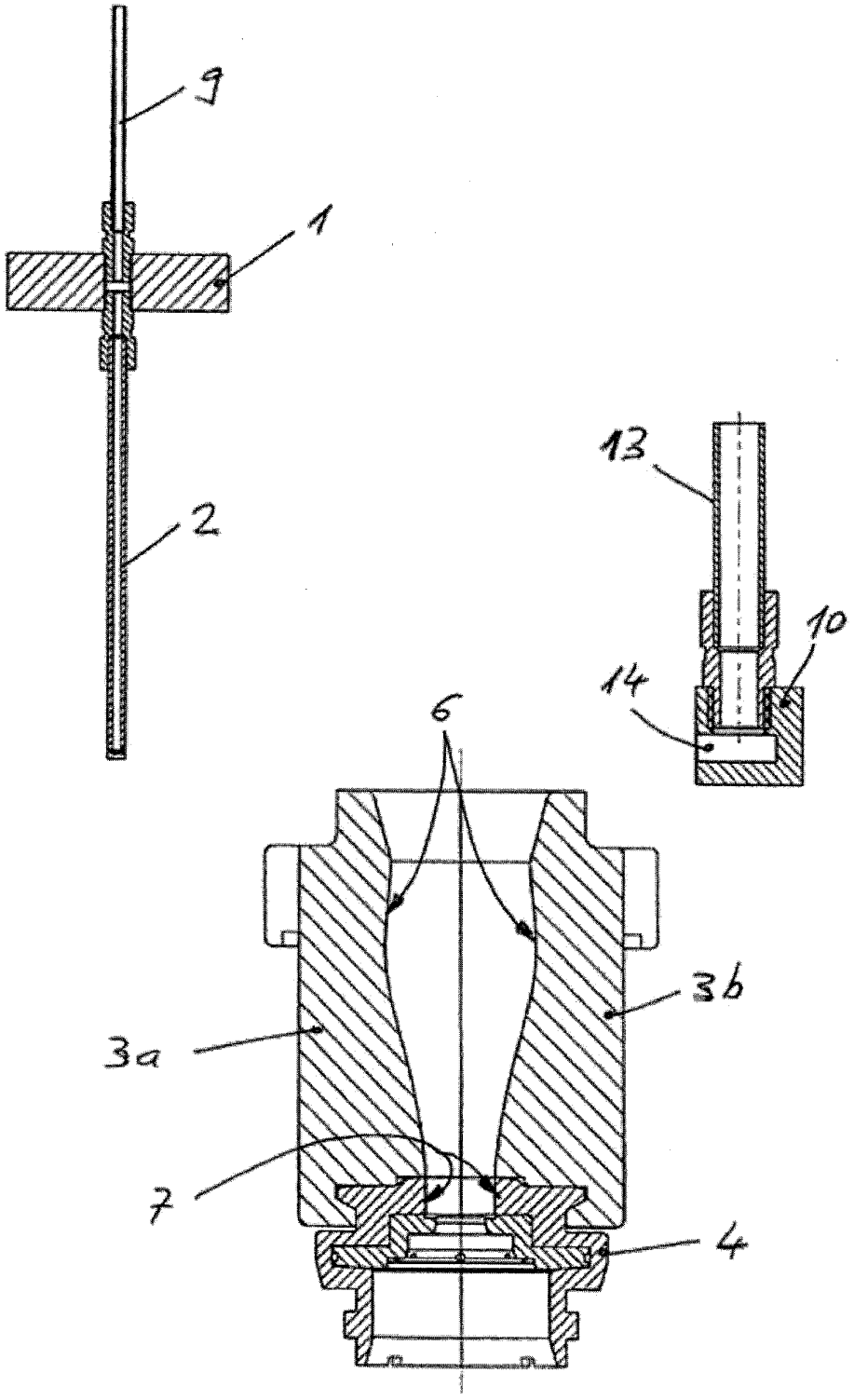
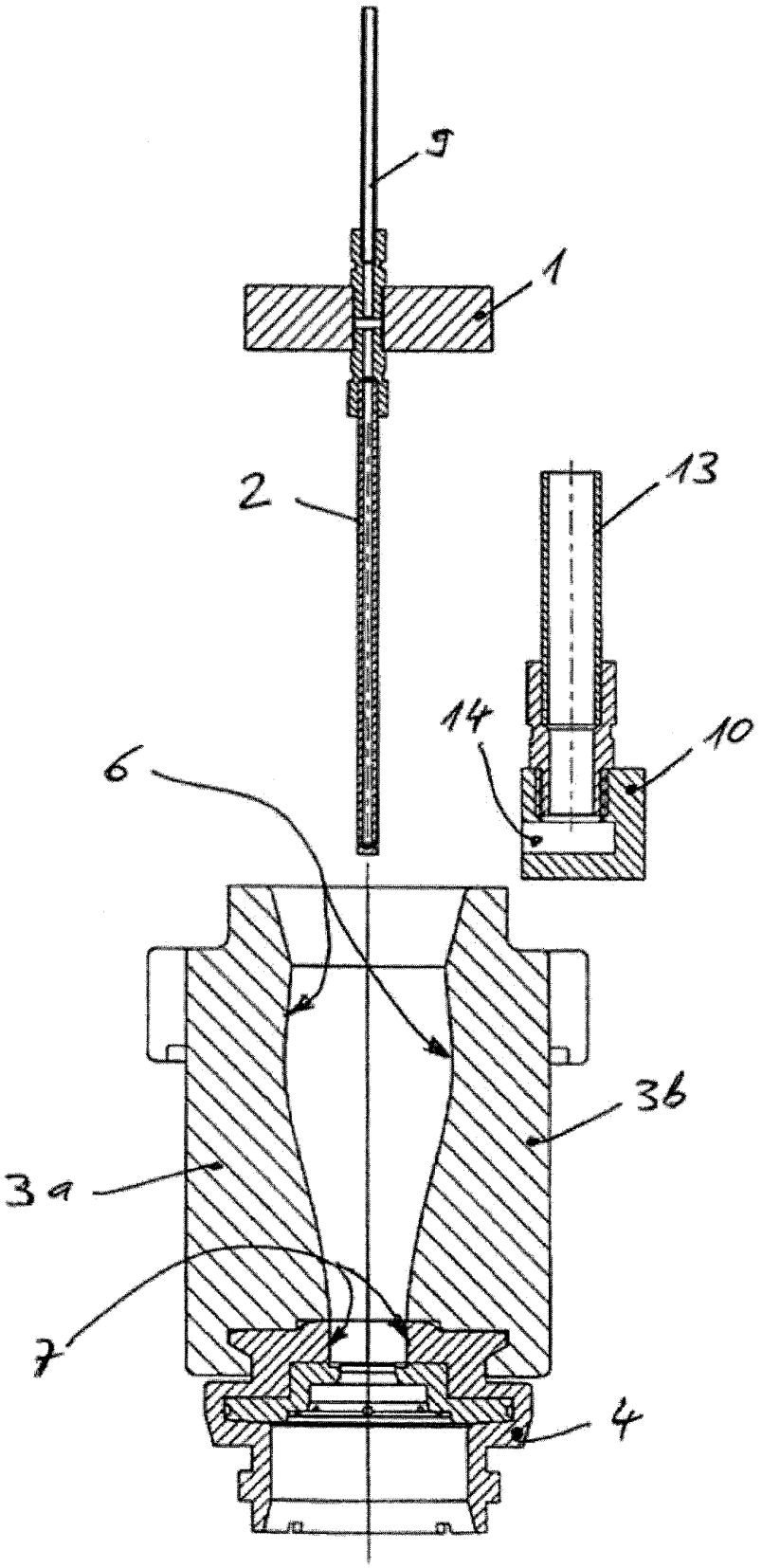


Figure 1



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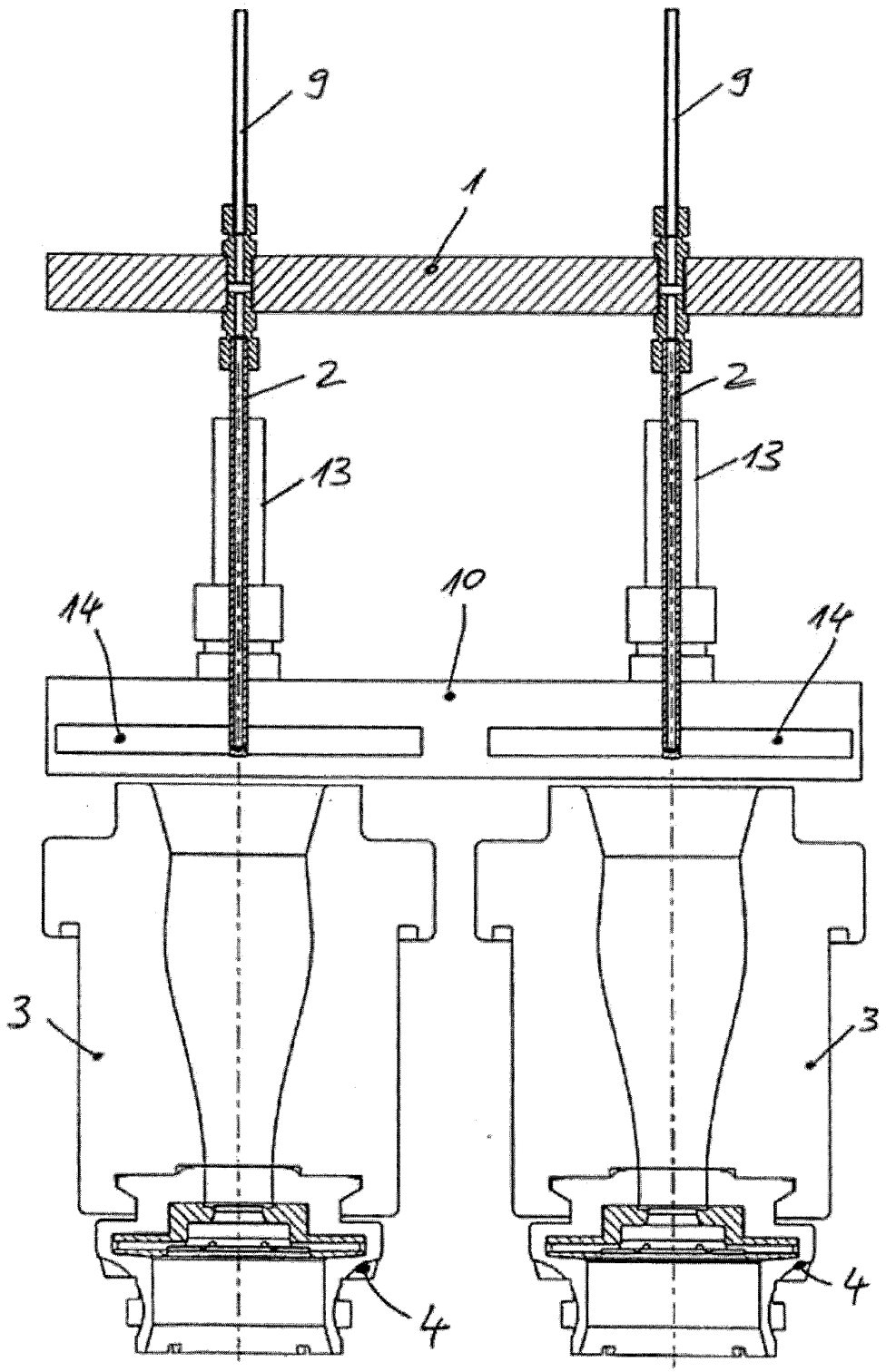

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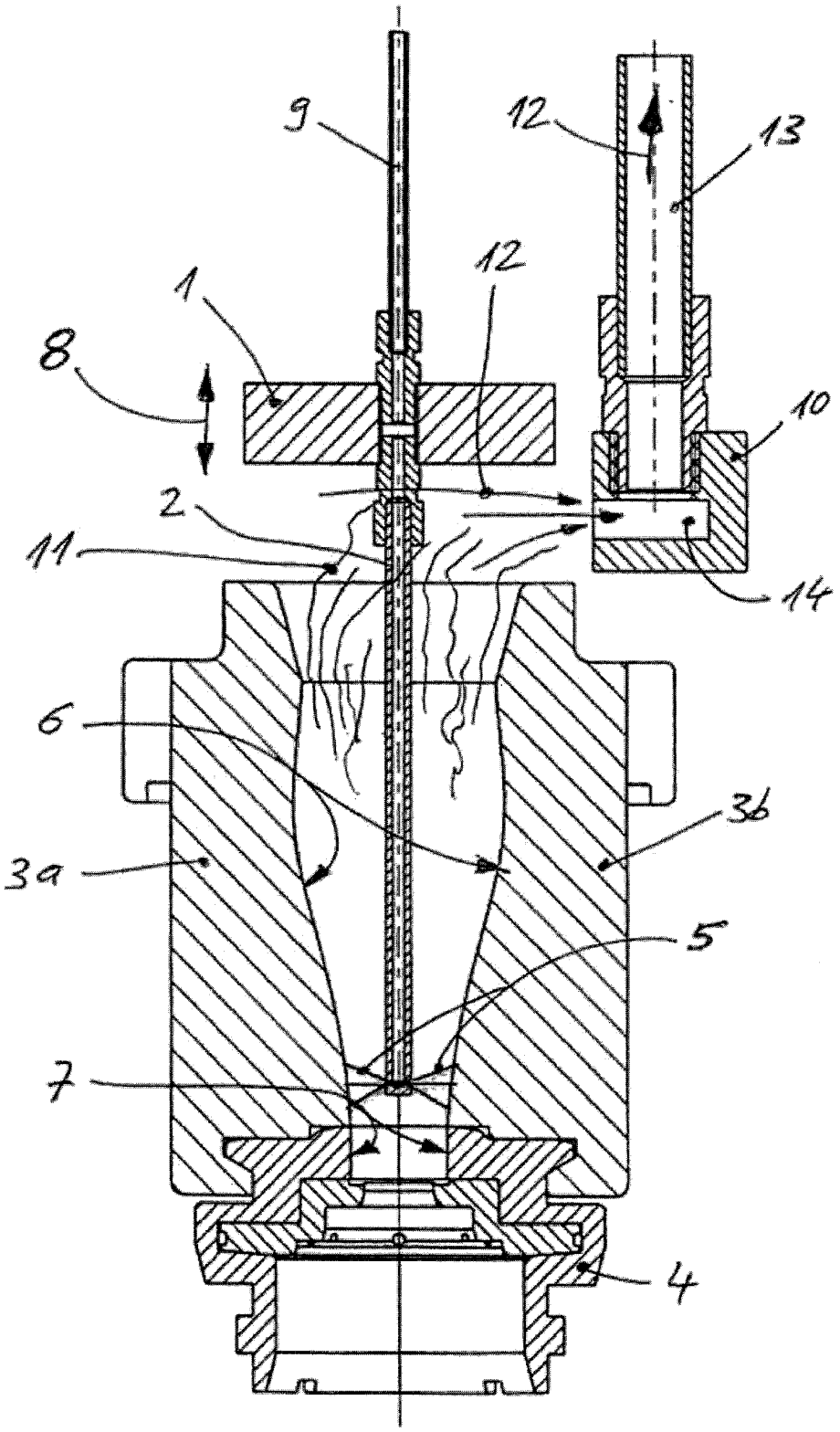

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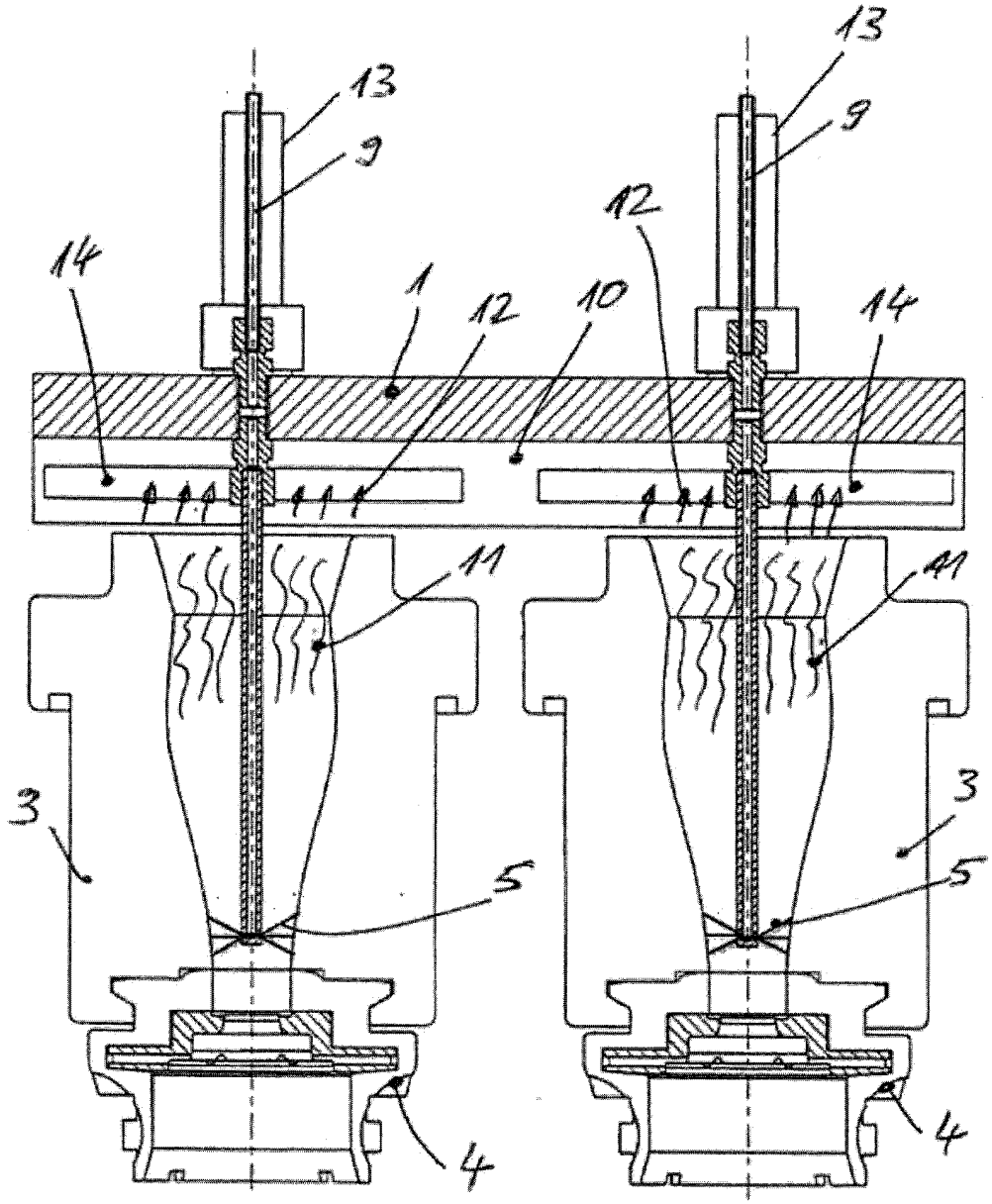

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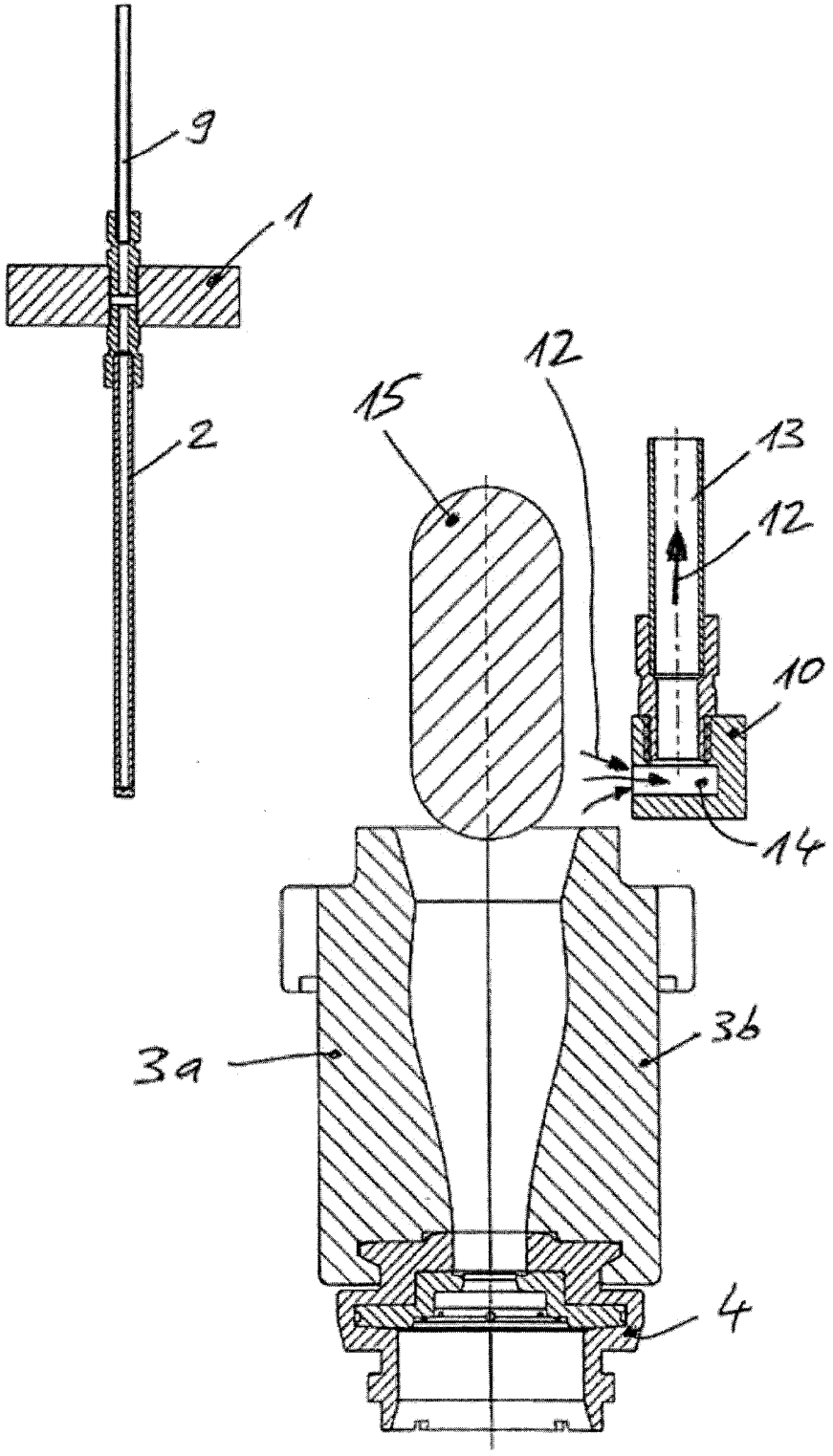

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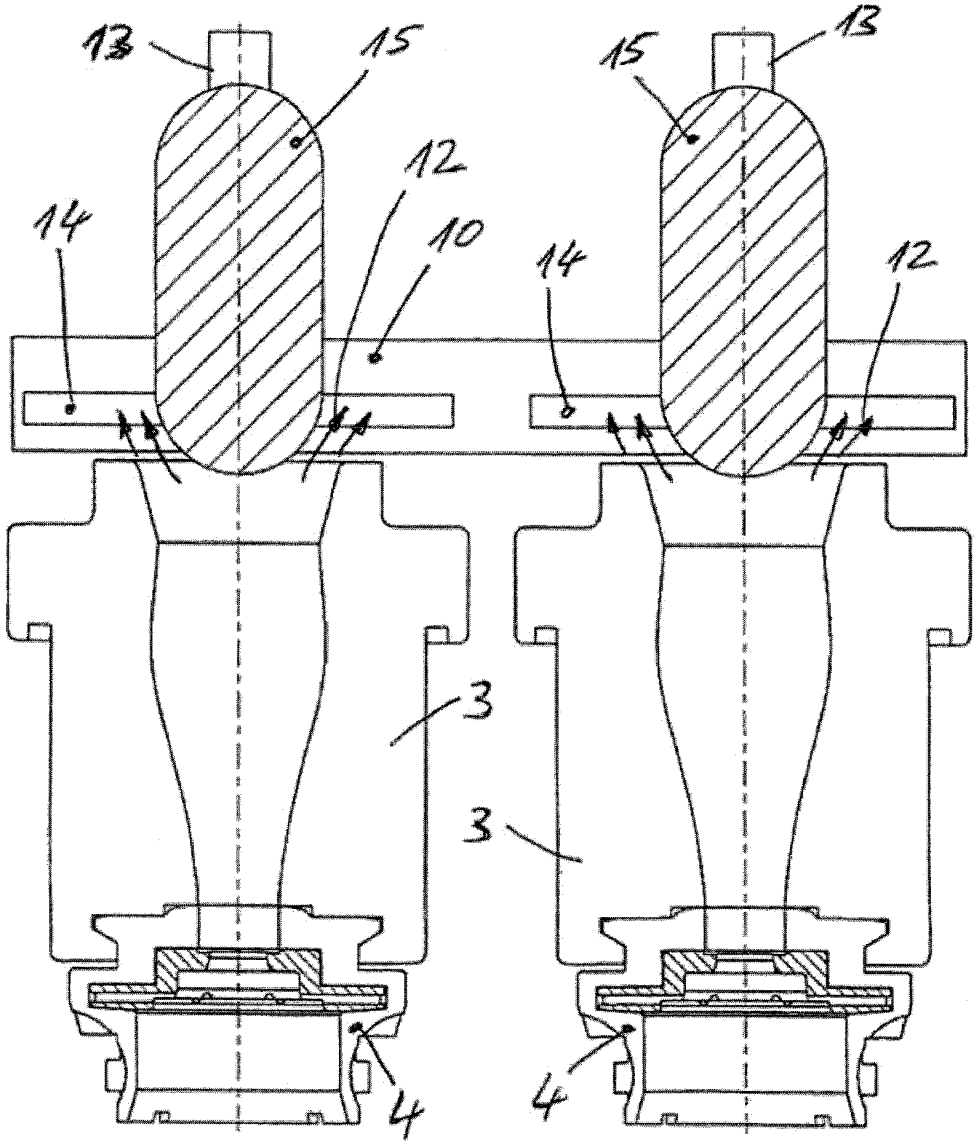

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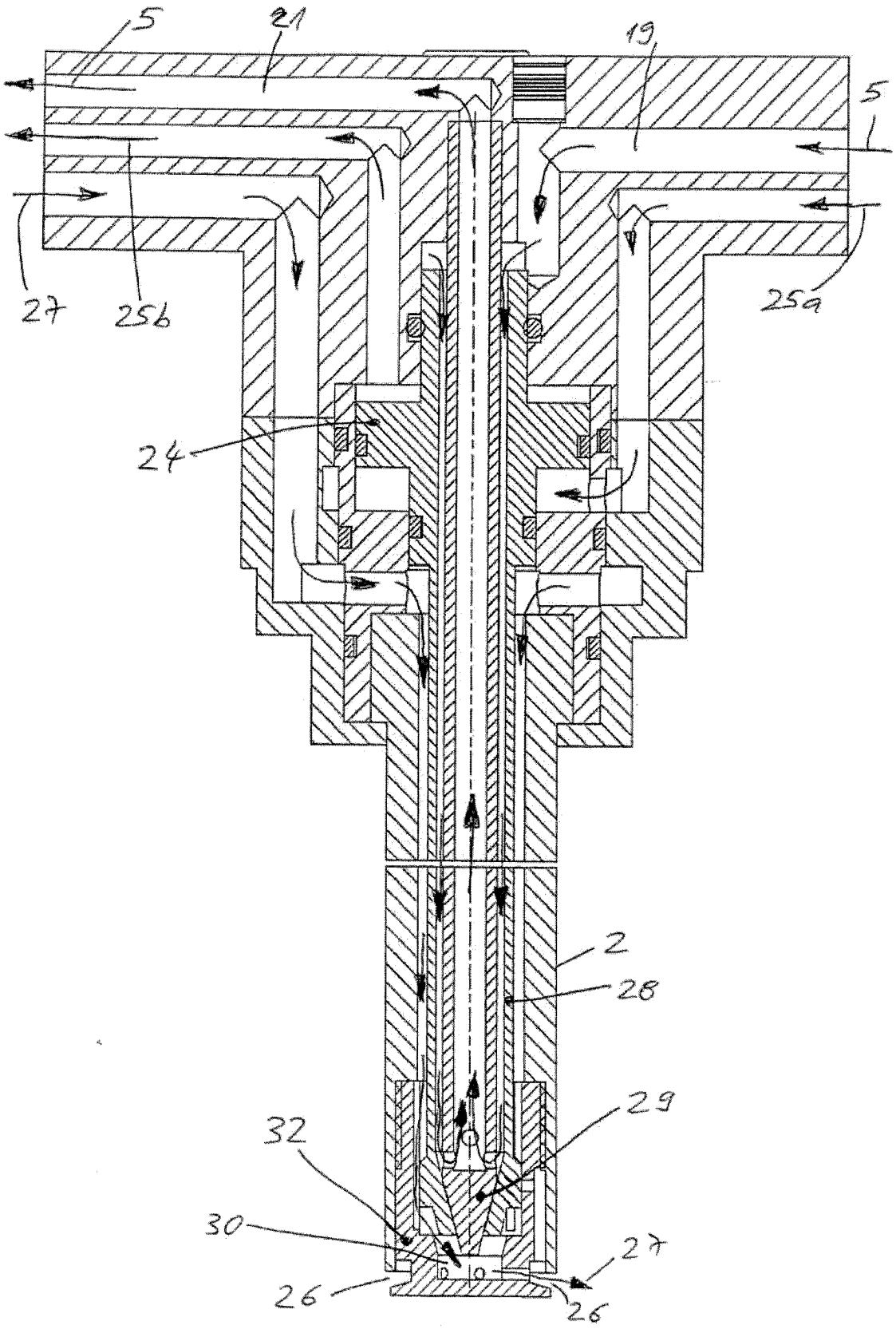

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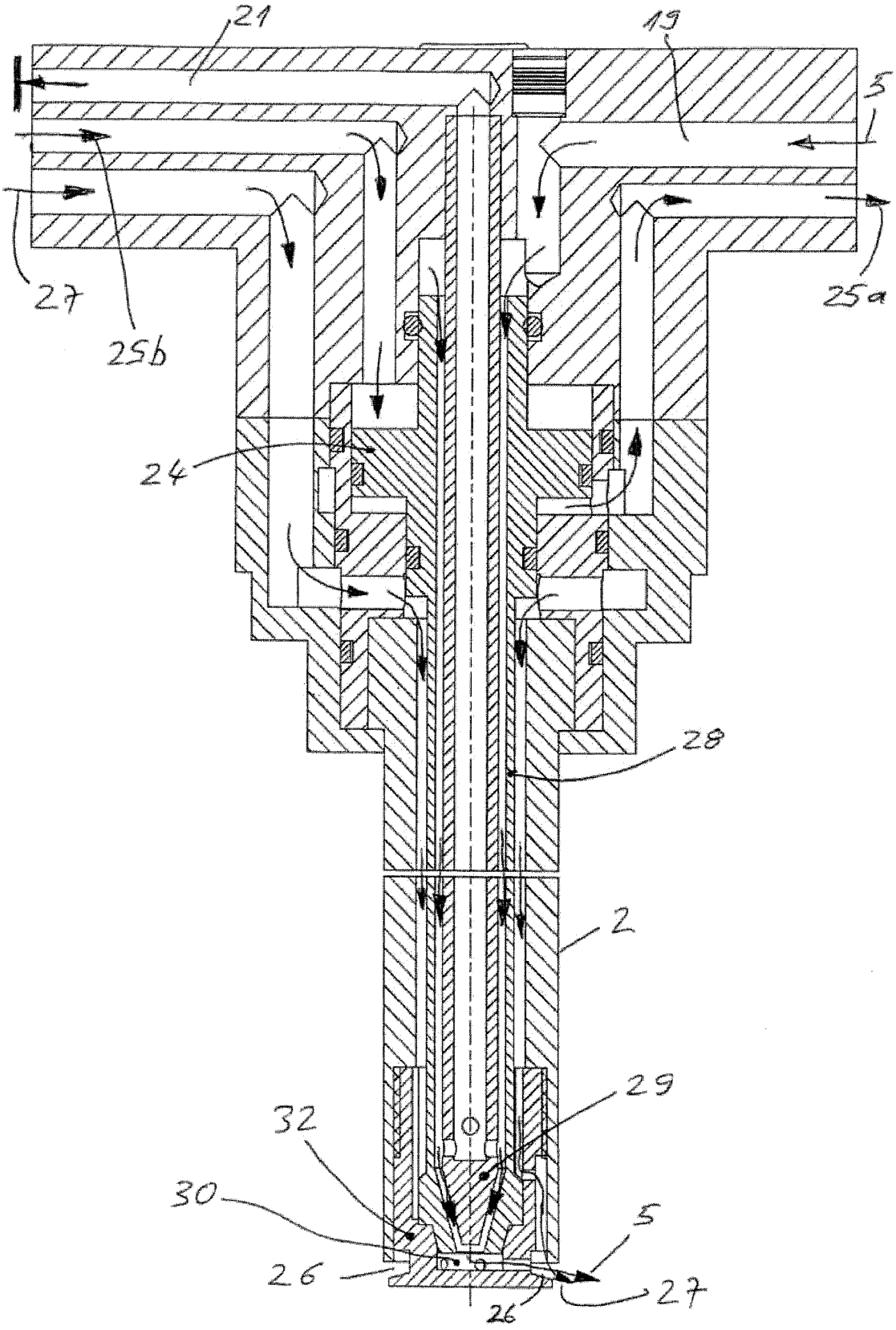

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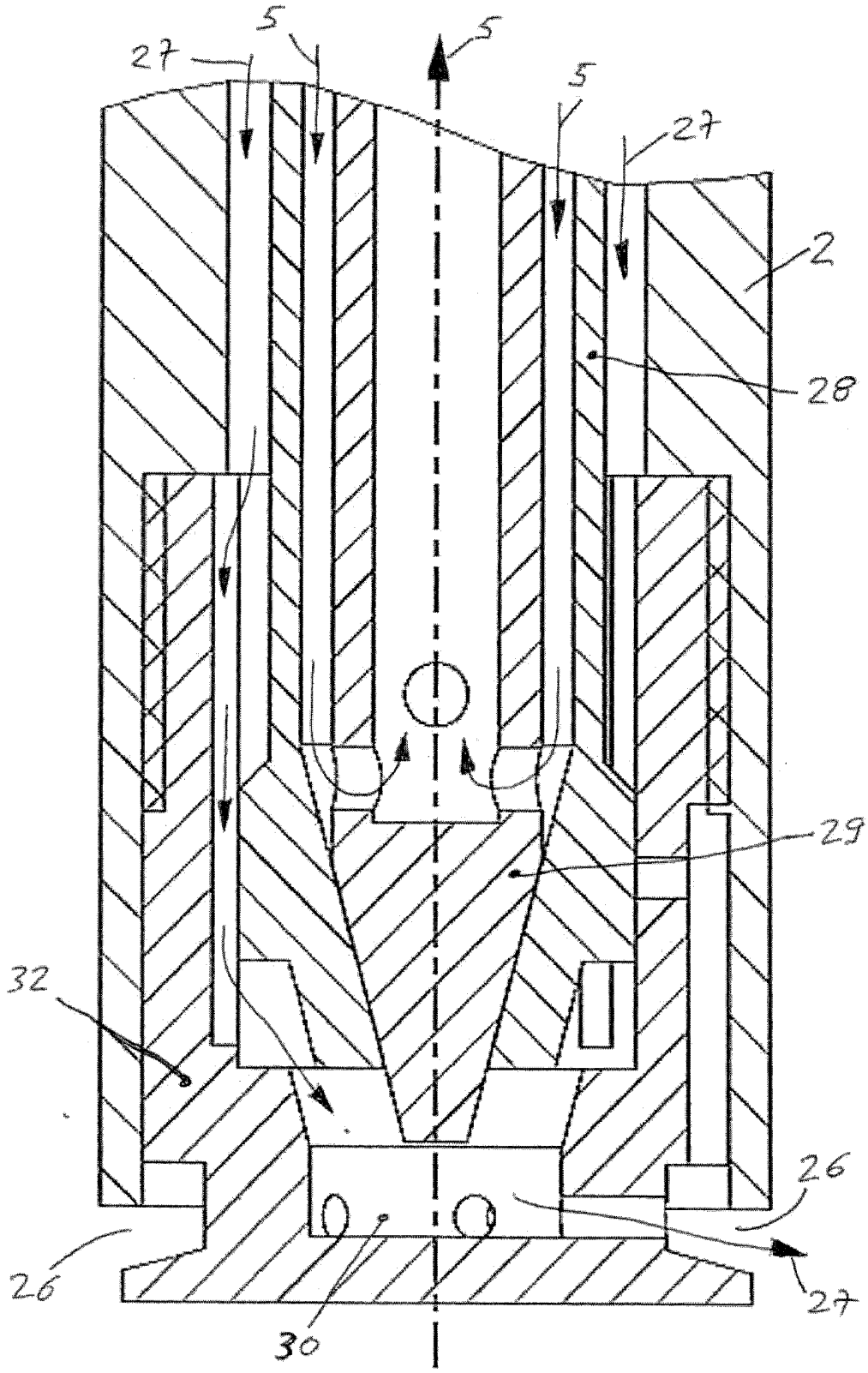

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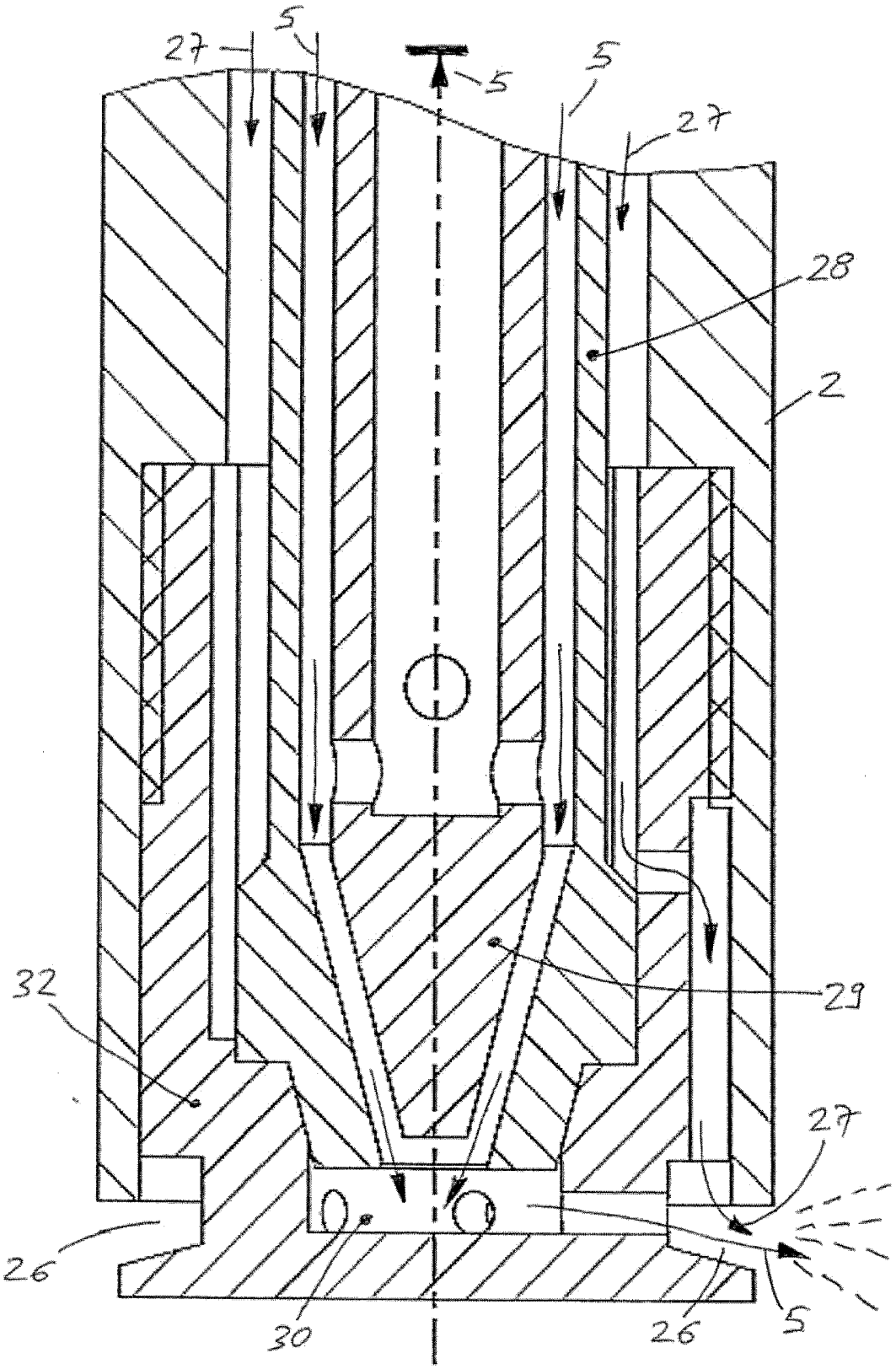

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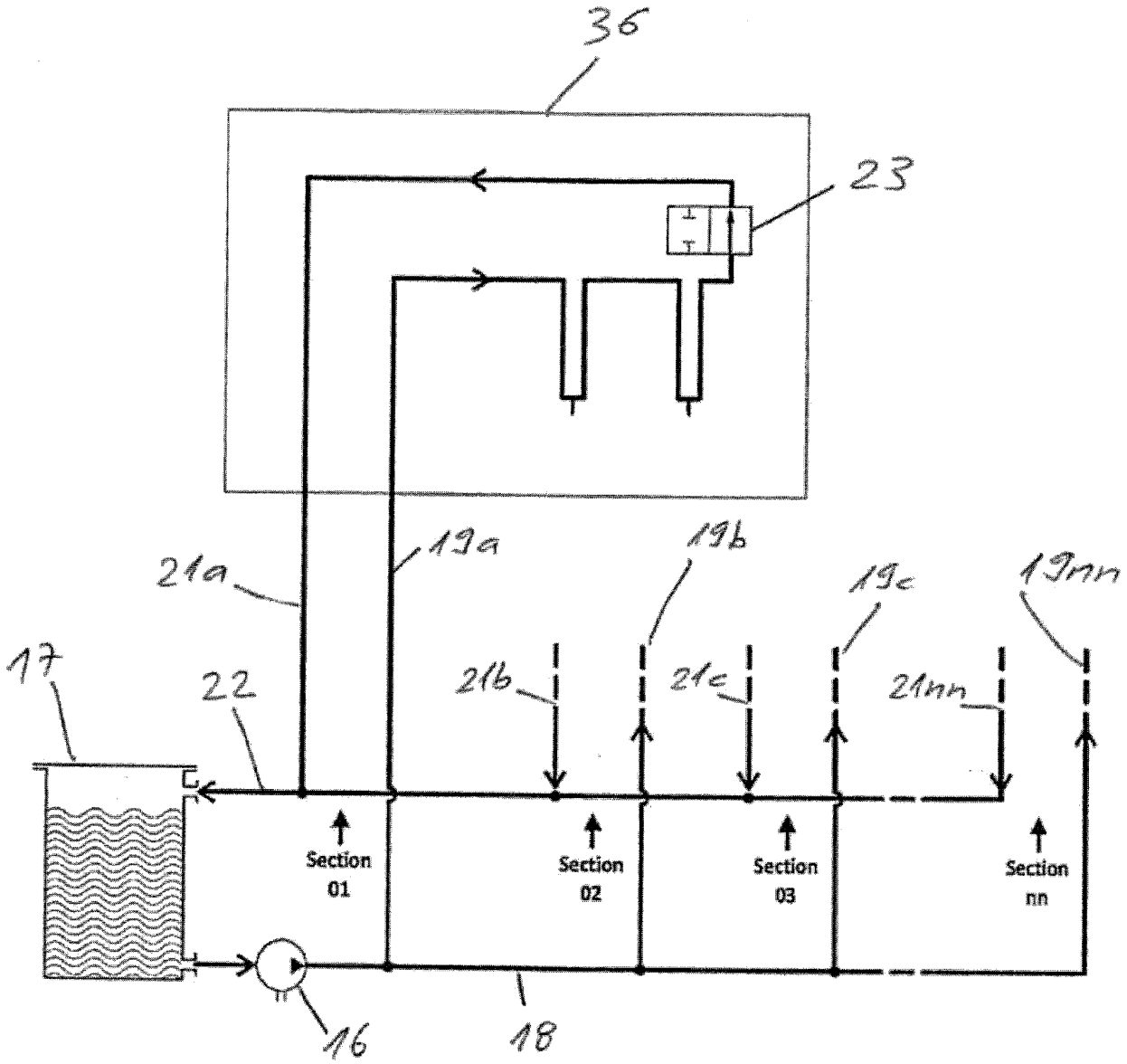
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Figure 12

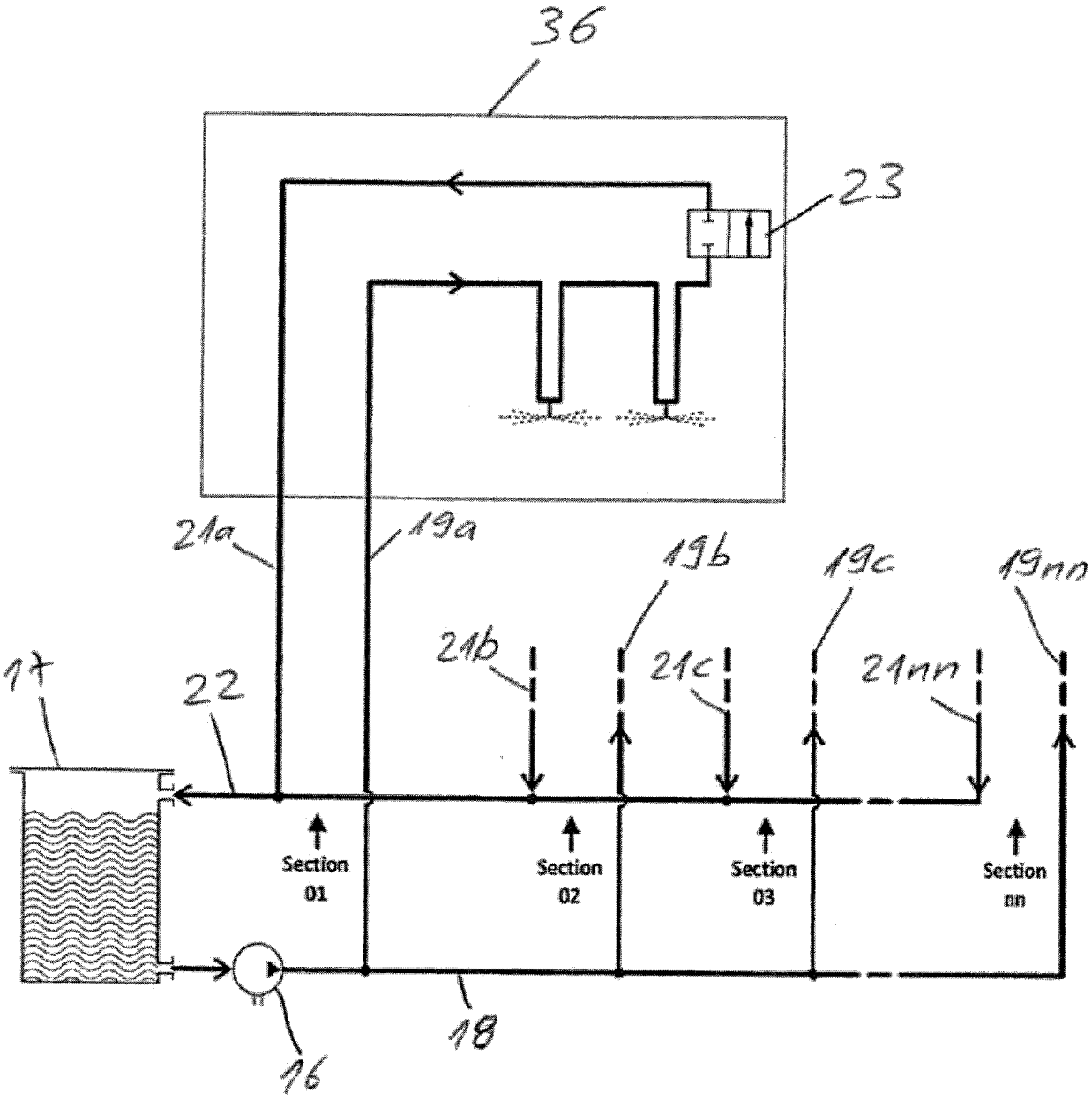
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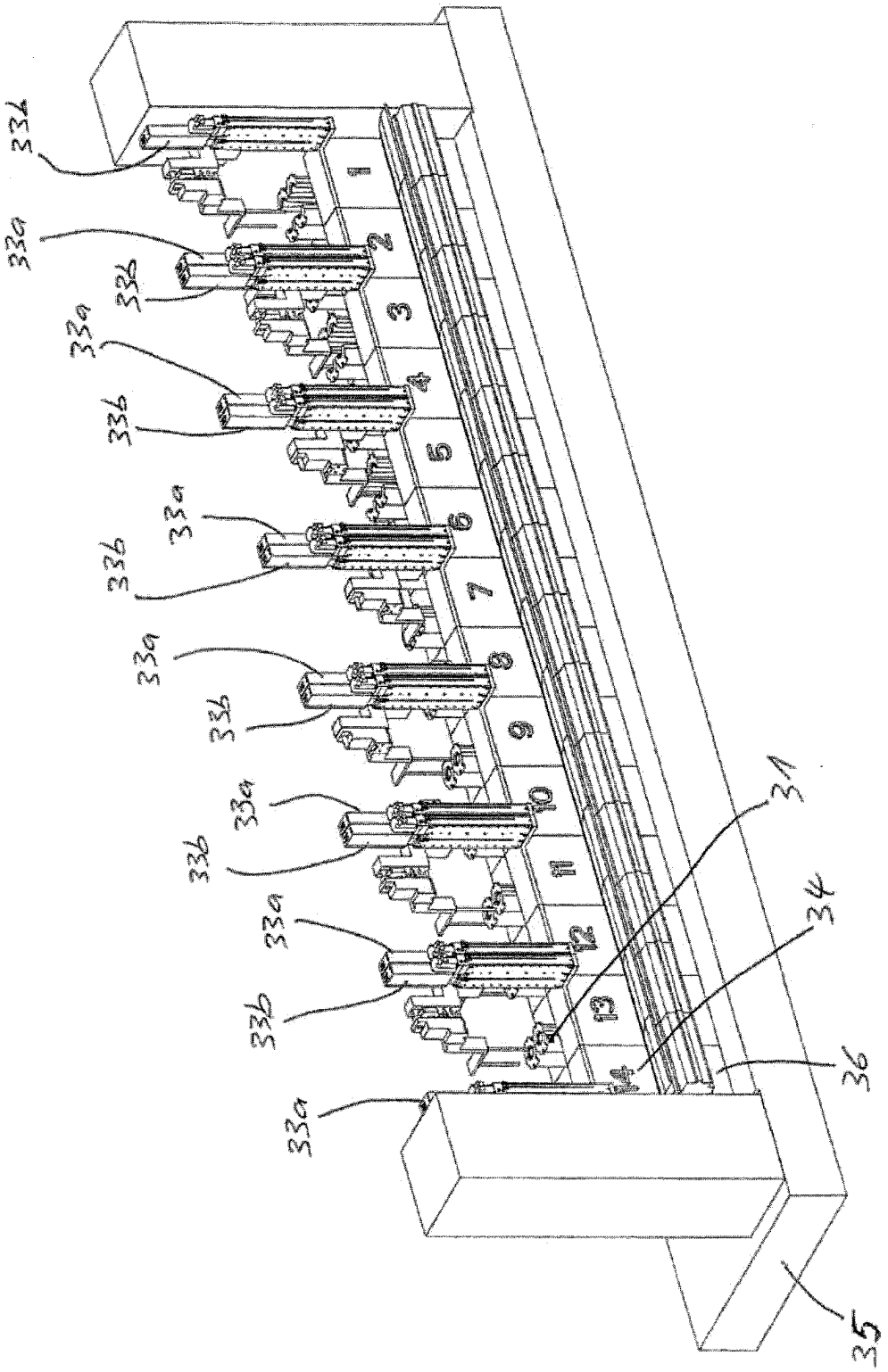
Figure 13



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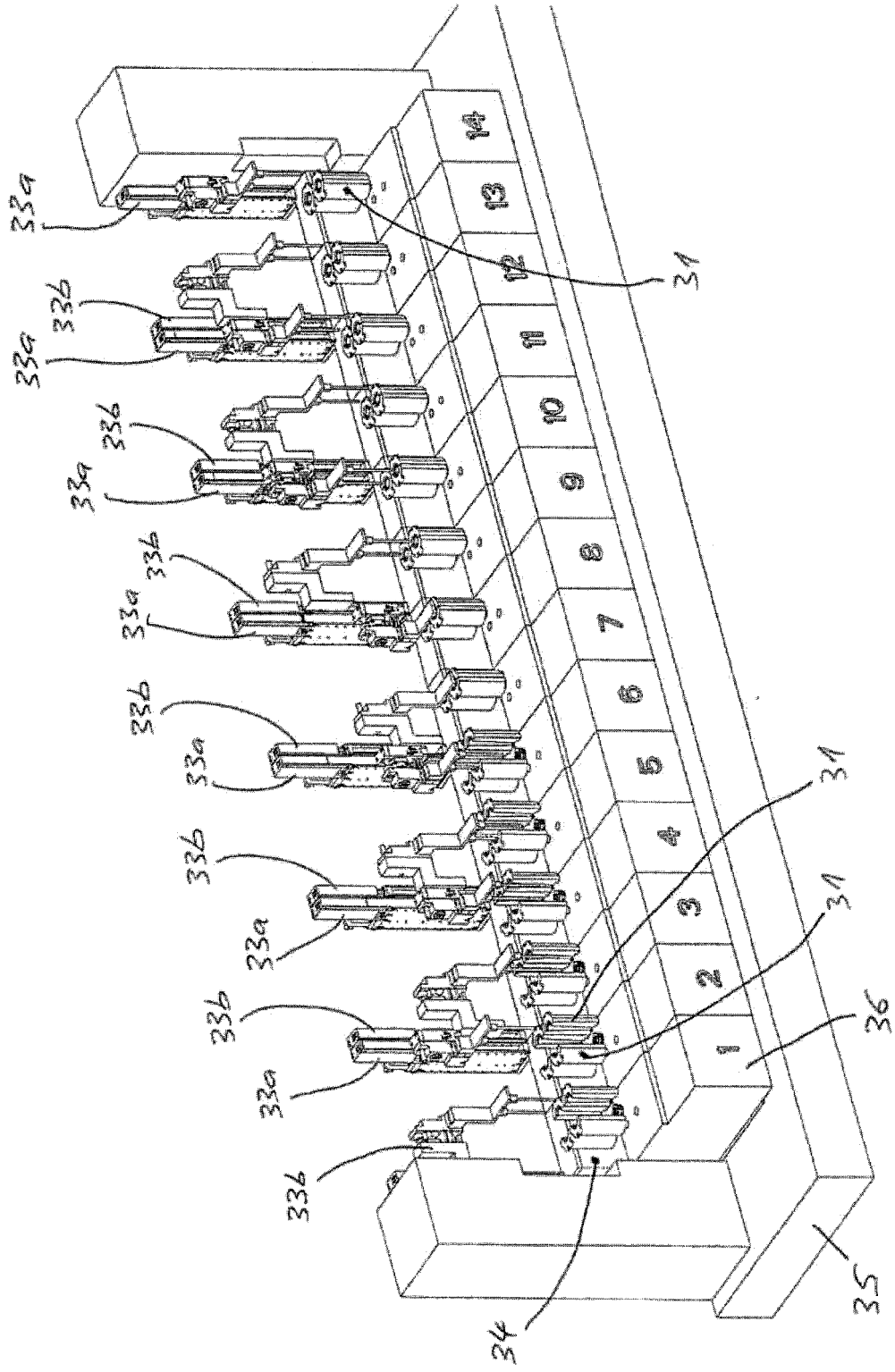

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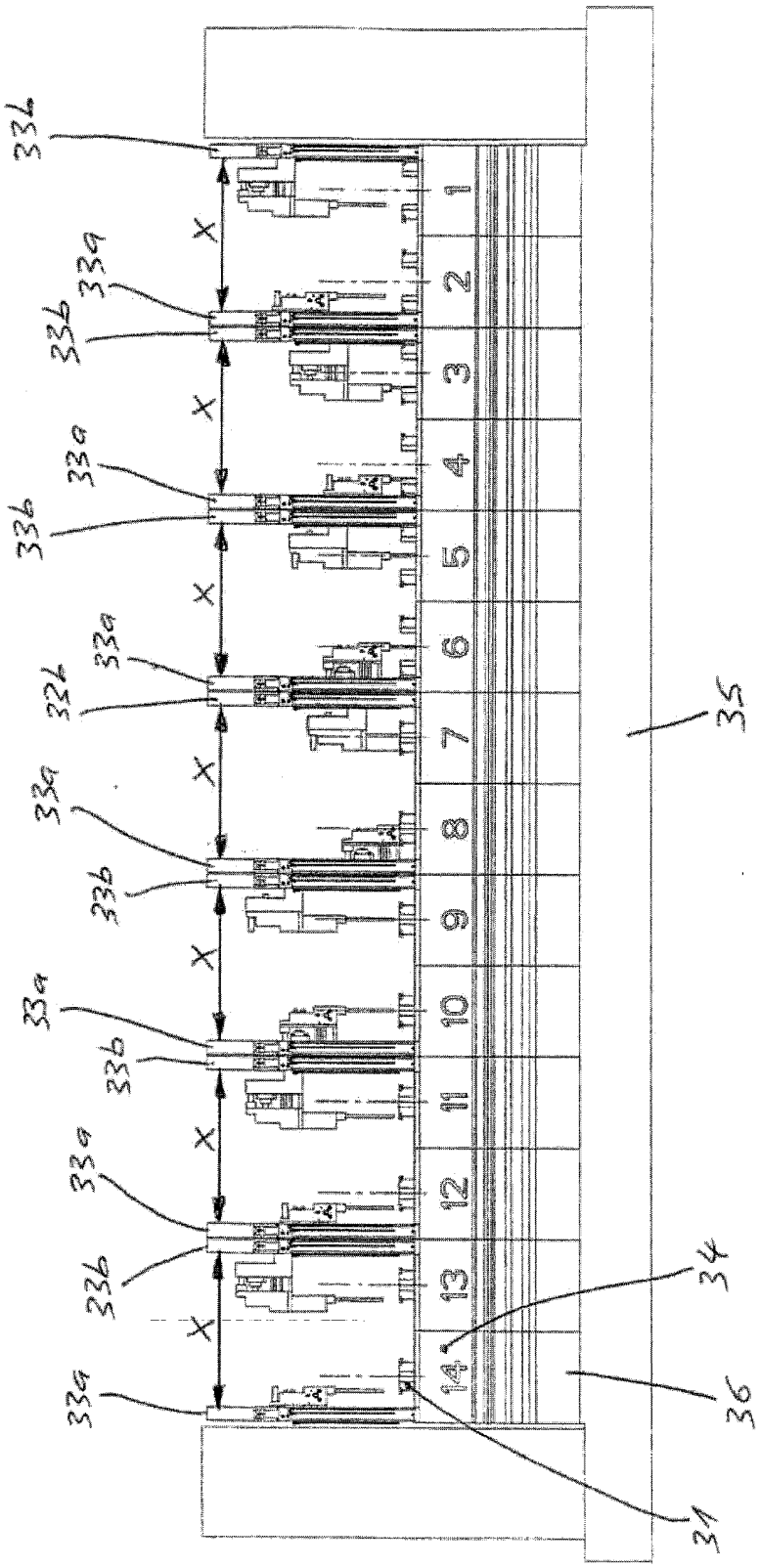
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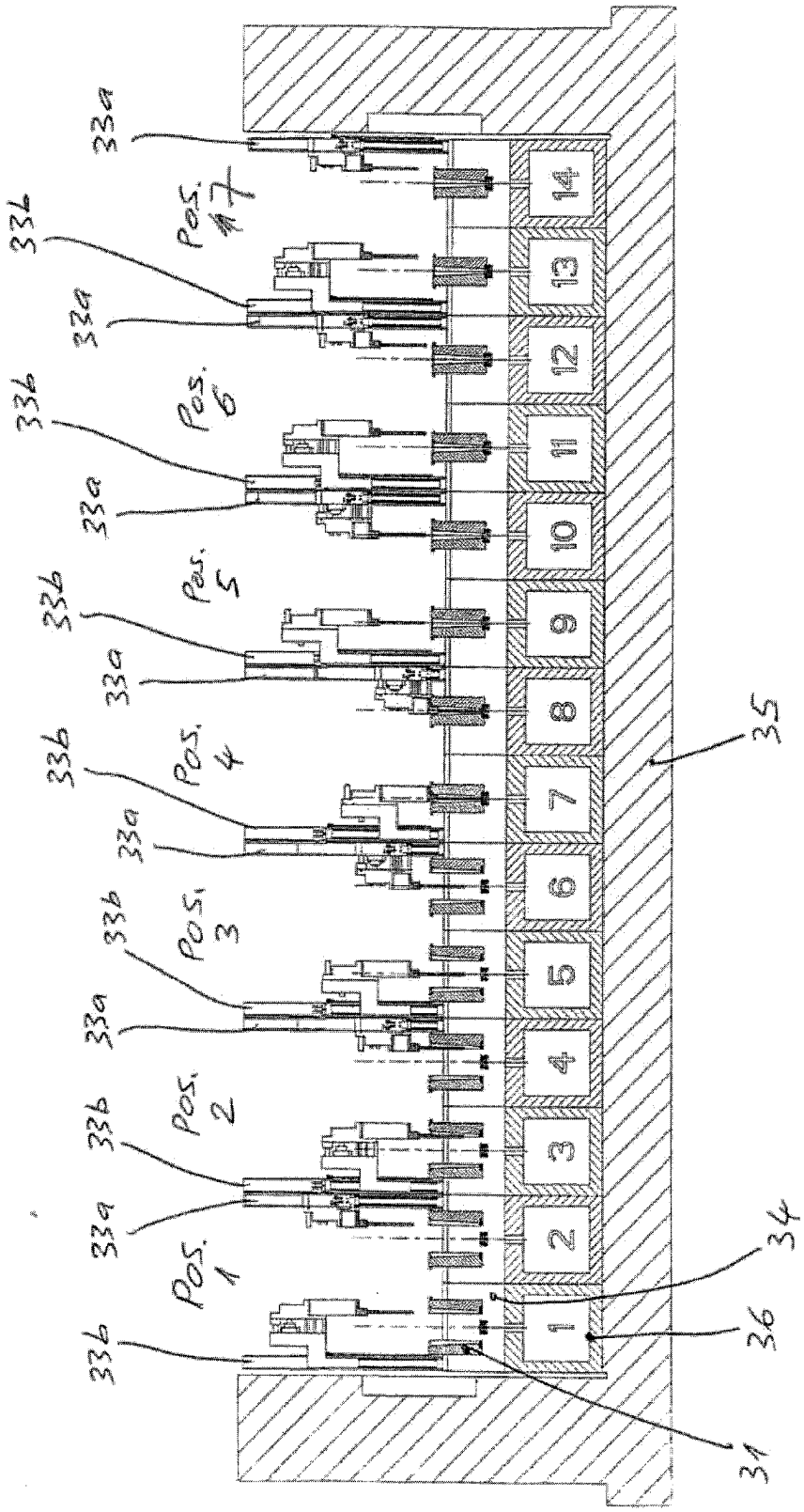
Figure 16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Pos. 5
Pos. 4
Pos. 3
Pos. 2
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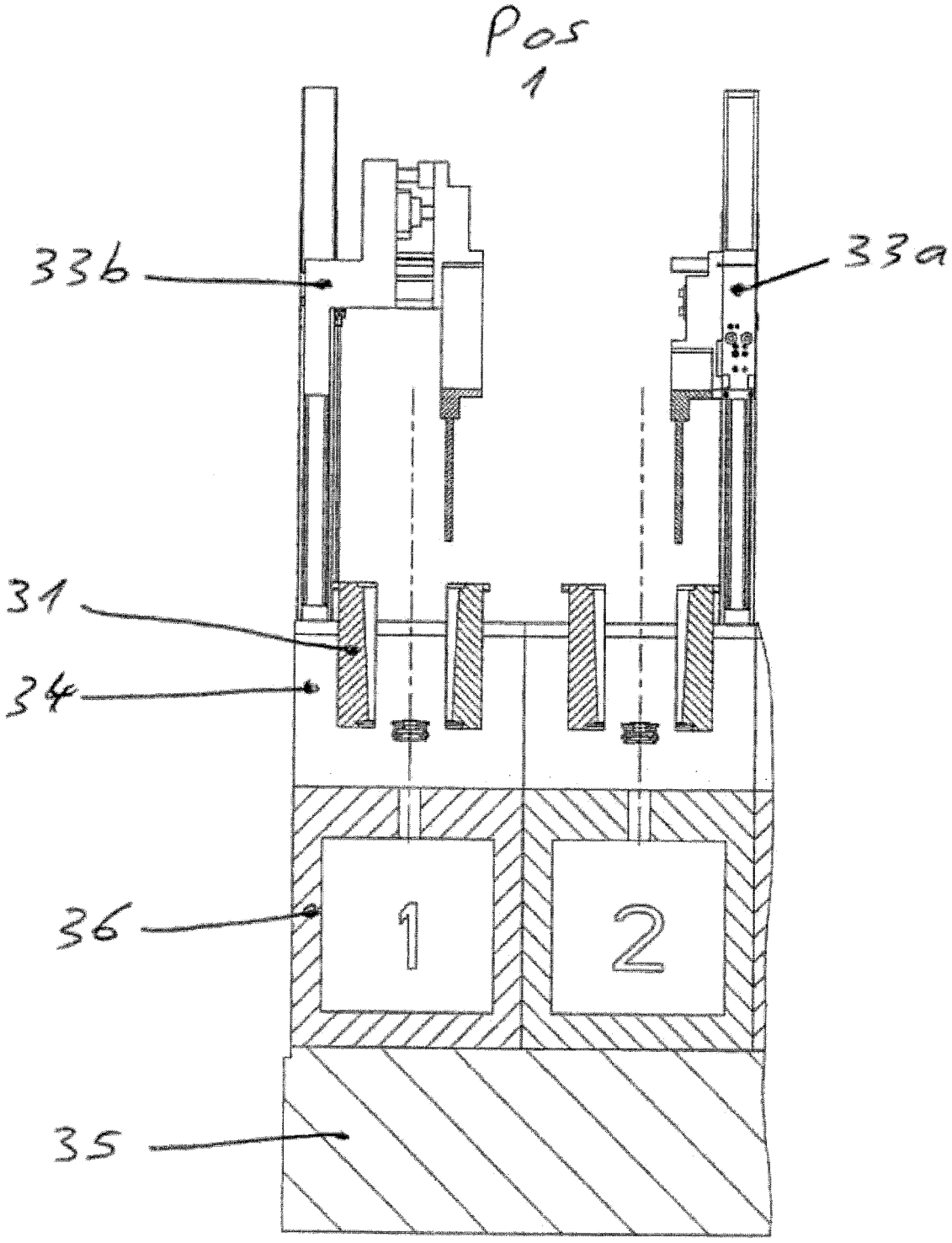
Figure 17



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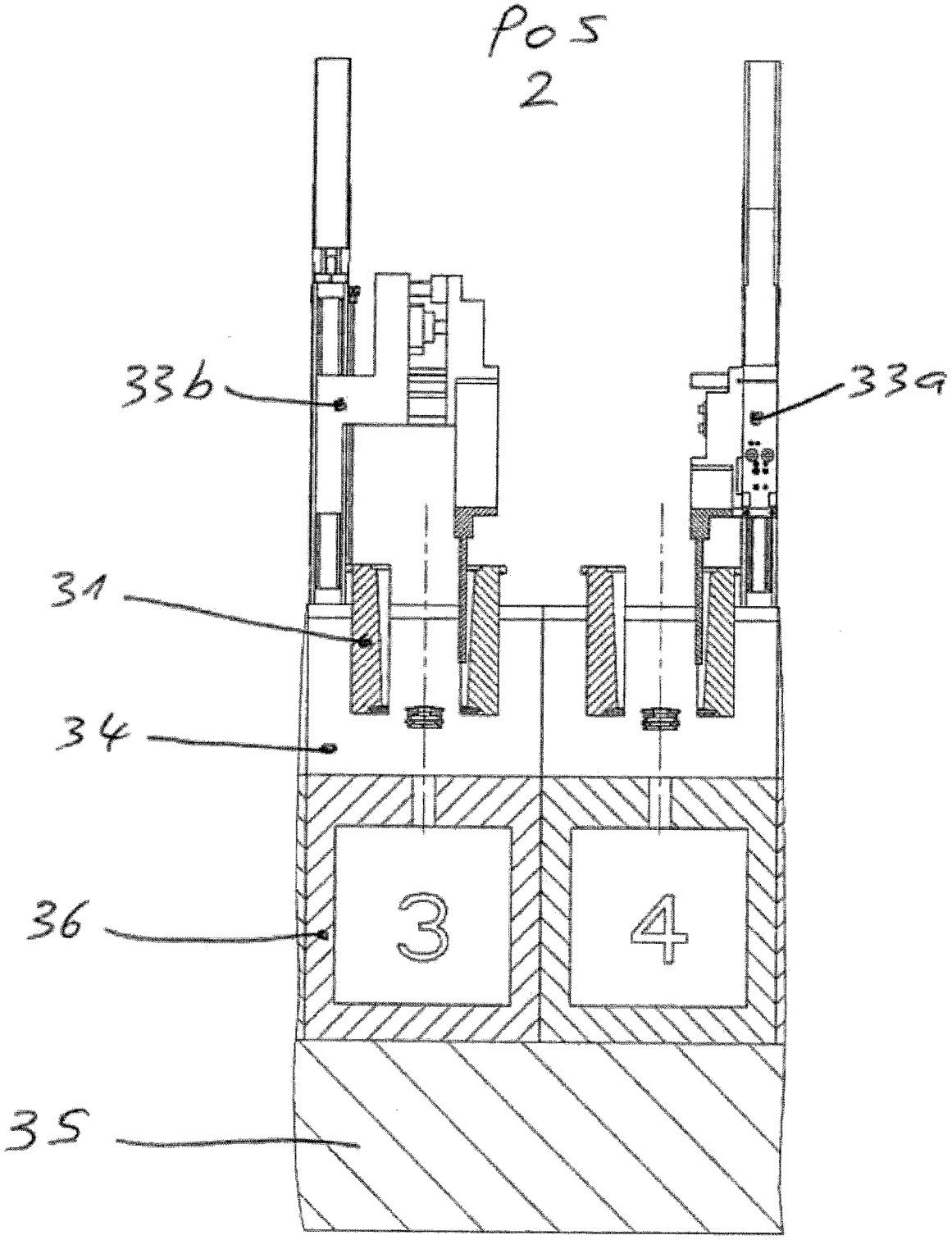

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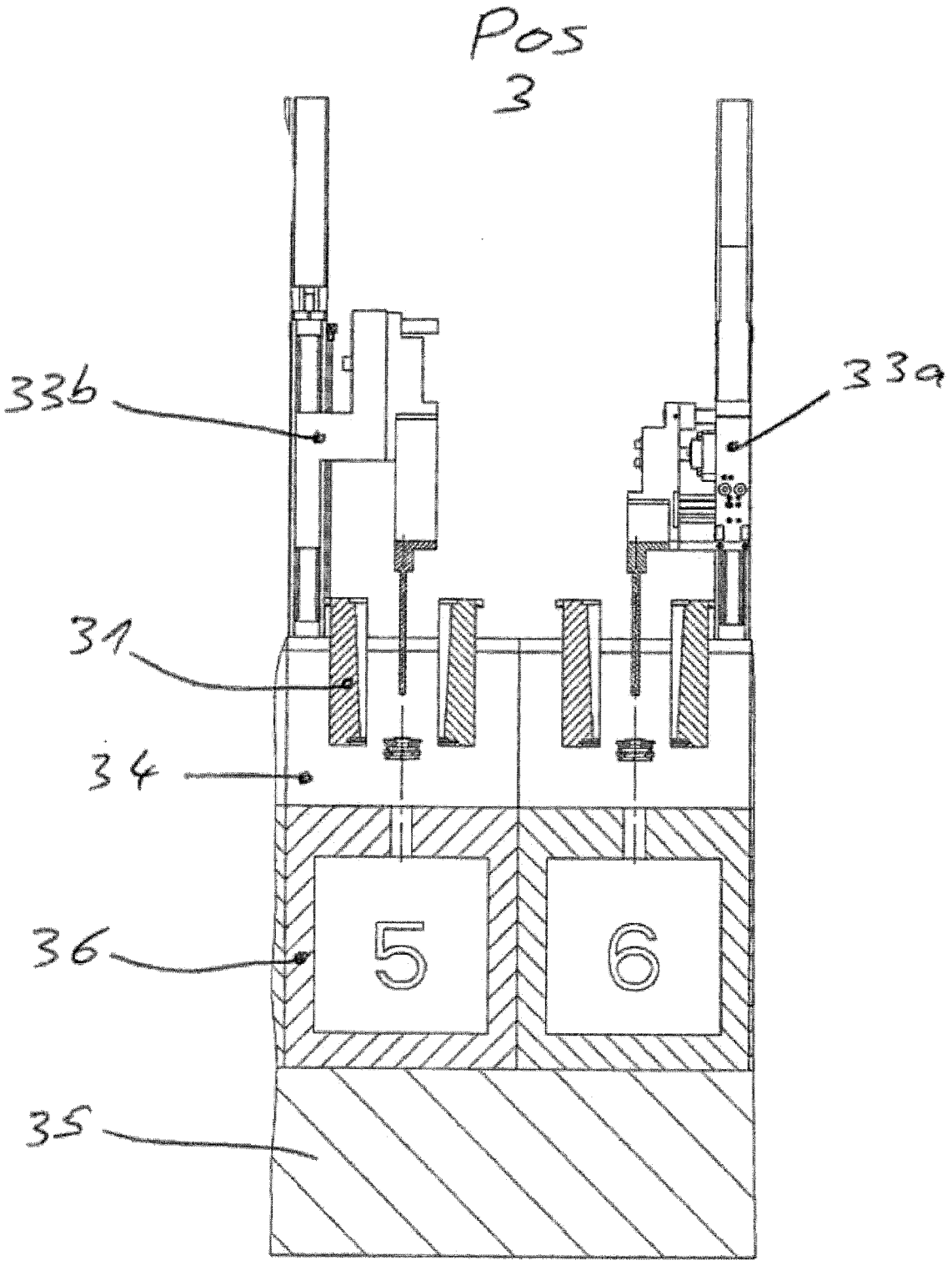

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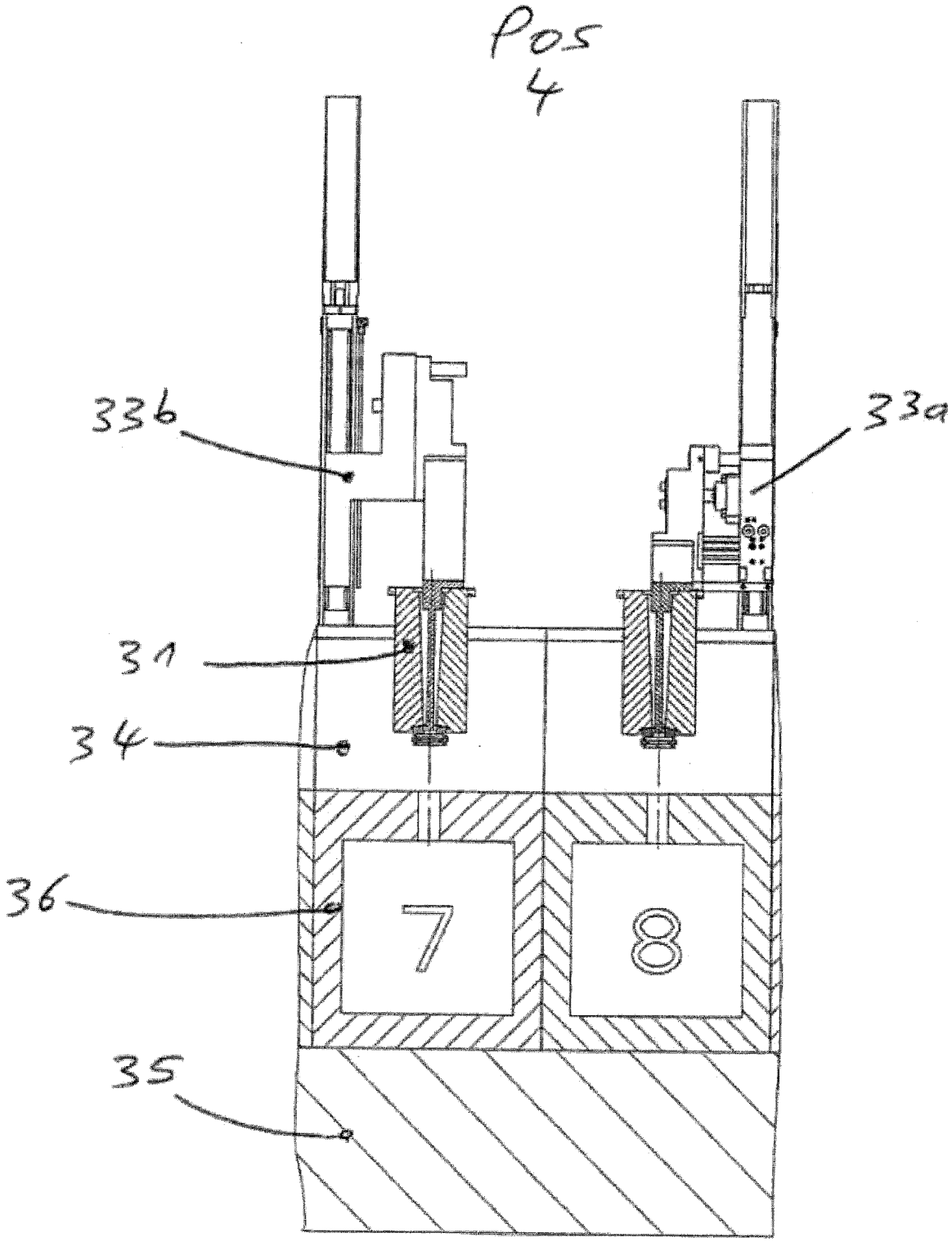

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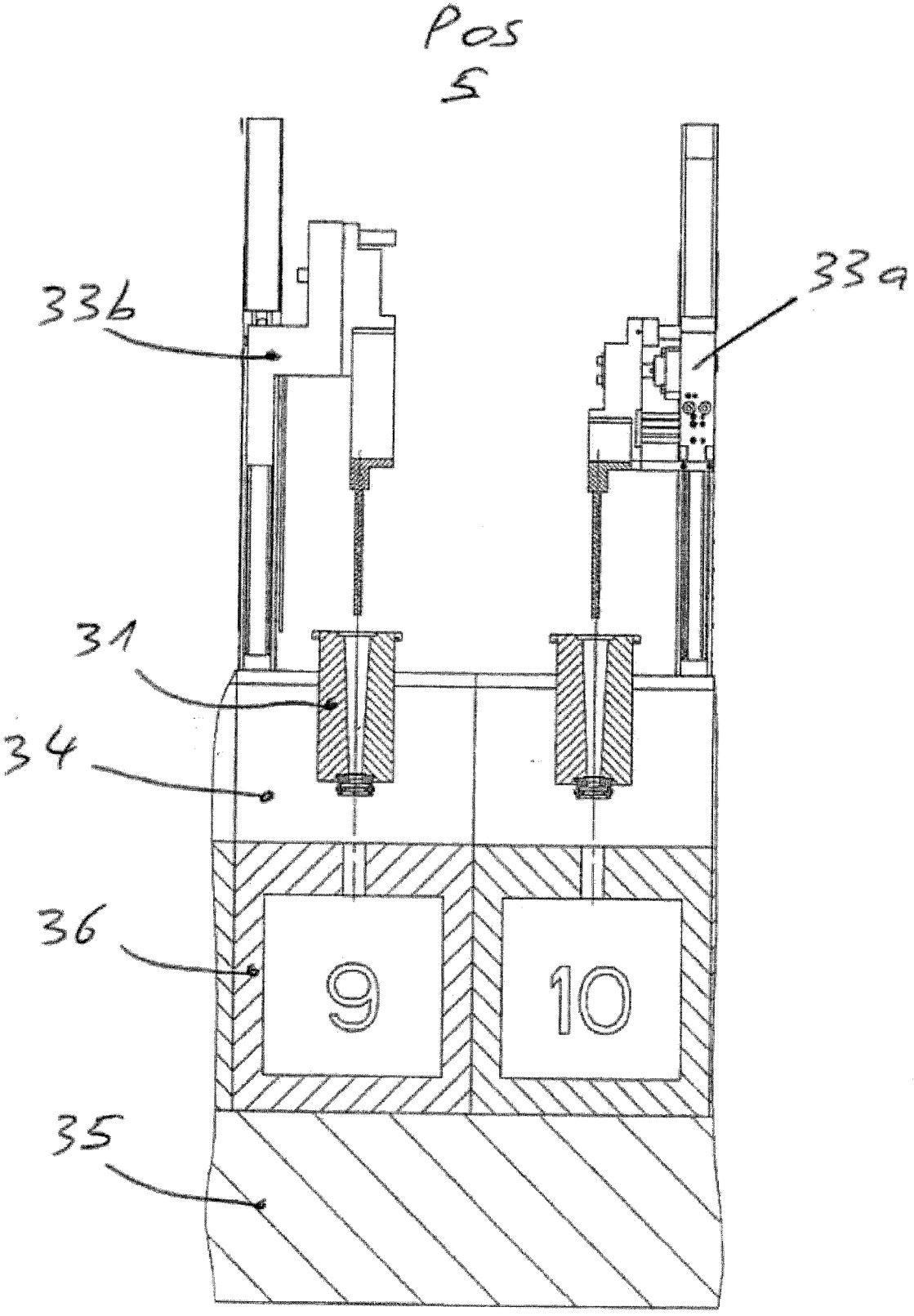

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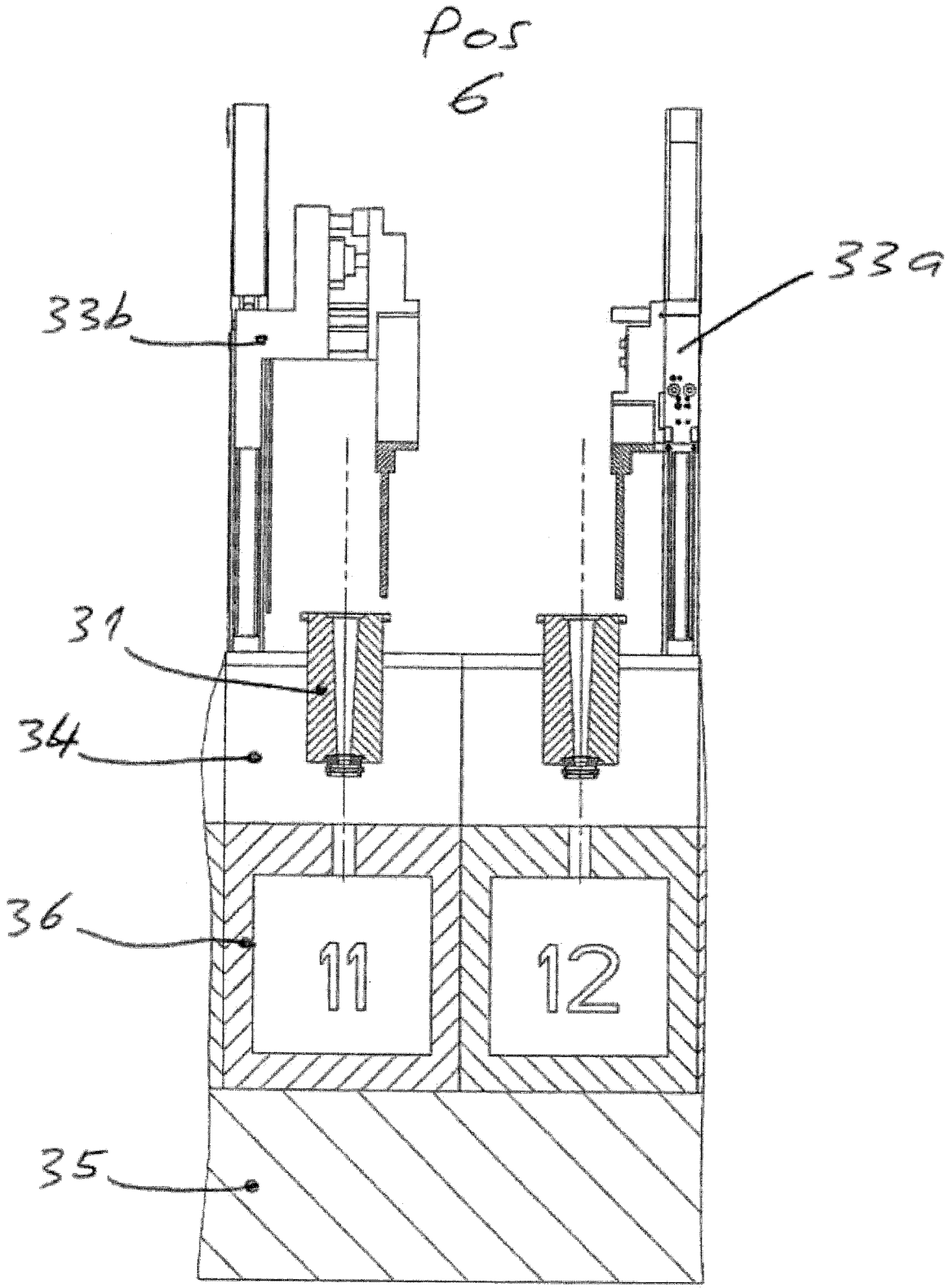

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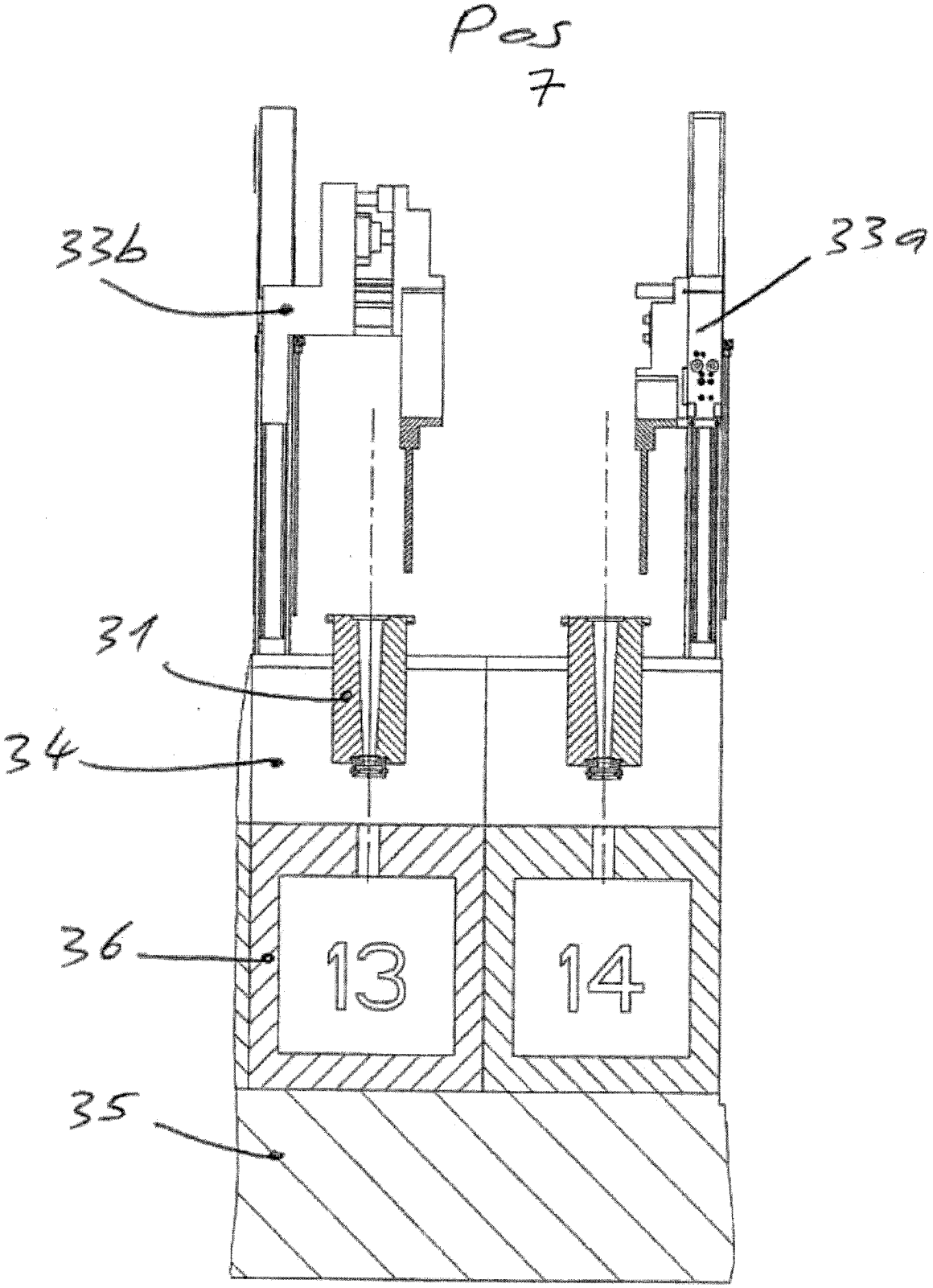

Figure 24

REFERENCES CITED IN THE DESCRIPTION

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