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NL-5600 AP Eindhoven (NL)(54) **Device for cleaning filling machine.**

(57) A device for cleaning a filling machine comprises means for supplying a wash liquor to a filling liquid tank 13, and collection means for collecting through the nozzle 15 the wash liquor supplied to the tank 13. The collection means comprises a liquid receptacle 111 having an inlet portion 113 connectable to the discharge end of the nozzle 15, a laterally projecting conduit 112 integral with a side wall of the receptacle 111 and communicating with the interior of the receptacle 111, a tubular connector 212 having removably joined to one end thereof an outlet end of the conduit 112 and connected at the other end thereof to a collection pipe 49, support means supporting the connector 212 upwardly or downwardly pivotally movably at one side of the nozzle 15 so that the inlet portion 113 can be removably connected to the nozzle discharge end with the conduit 112 joined to the connector 212, and means for removably connecting the receptacle 111 to the tank 15 with the inlet portion 113 connected to the

nozzle discharge end.

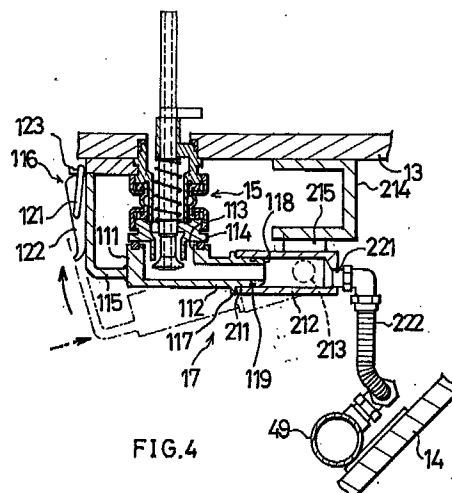


FIG. 4

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BACKGROUND OF THE INVENTION

The present invention relates to a device for cleaning filling machines for filling containers with juice or like liquid.

As disclosed, for example, in the publication JP-B-52-23309, such a device already known is adapted to clean a filling machine having a liftable filling liquid tank and a filling nozzle attached to the bottom wall of the tank in suspension. The device comprises means for supplying a wash liquor to the tank, and collection means for collecting through the nozzle the wash liquor supplied to the tank. The collection means comprises a liquid receptacle having an inlet portion connectable to a discharge end of the filling nozzle, a laterally projecting conduit having an inlet end integral with a side wall of the receptacle and communicating with the interior of the receptacle, the conduit having an outlet end connected to a wash liquor collection pipe, means for supporting the conduit horizontally movably so as to move the inlet portion to a position immediately below the nozzle discharge end or to retract from the position, and means for lifting or lowering the tank along with the filling nozzle so as to removably connect the nozzle discharge end to the inlet portion as advanced to the position immediately therebelow.

To connect the filling nozzle to the liquid receptacle, it is necessary to vertically move the nozzle along with the tank and to horizontally move the receptacle, so that the device has the problem that the connecting procedure is cumbersome and takes much time. The device has another problem in that the mechanisms for moving the nozzle and the receptacle are complex. Especially, the tank is bulky and heavy and therefore requires a large device for the upward or downward movement thereof.

SUMMARY OF THE INVENTION

The main object of the present invention is to provide a cleaning device of the type mentioned which is so adapted that the collection pipe for collecting a wash liquor from the filling nozzle can be connected to the nozzle easily within a short period of time.

The present invention provides a device for cleaning a filling machine having a filling liquid tank and a filling nozzle attached to the bottom wall of the tank in suspension. The cleaning device comprises means for supplying a wash liquor to the tank, and collection means for collecting through the nozzle the wash liquor supplied to the tank. The device is characterized in that the collection means comprises a liquid receptacle having an inlet portion connectable to a discharge end of the

filling nozzle, a laterally projecting conduit having an inlet end integral with a side wall of the receptacle and communicating with the interior of the receptacle, a tubular connector having removably joined to one end thereof an outlet end of the conduit and connected at the other end thereof to a collection pipe, support means supporting the connector upwardly or downwardly pivotally movably at one side of the filling nozzle so that the inlet portion can be removably connected to the nozzle discharge end with the conduit joined to the connector, and means for removably connecting the receptacle to the tank with the inlet portion connected to the nozzle discharge end.

Thus, the connection means of the filling machine cleaning device of the invention comprises a liquid receptacle having an inlet portion connectable to a discharge end of the nozzle, a laterally projecting conduit having an inlet end integral with a side wall of the receptacle and communicating with the interior thereof, a tubular connector having removably joined to one end thereof an outlet end of the conduit and connected at the other end thereof to a collection pipe, support means supporting the connector upwardly or downwardly pivotally movably at one side of the filling nozzle so that the inlet portion can be removably connected to the nozzle discharge end with the conduit joined to the connector, and means for removably connecting the receptacle to the tank with the inlet portion connected to the nozzle discharge end. Accordingly, the nozzle discharge end can be connected to the collection pipe at its inlet end by joining the outlet end of the conduit to the above-mentioned one end of the connector and connecting the receptacle to the tank.

Consequently, the filling nozzle can be connected to the collection pipe for collecting the wash liquor therefrom merely by connecting the conduit to the connector and connecting the liquid receptacle to the tank. This makes it possible to connect the filling nozzle to the collection pipe with ease within a short period of time. Moreover, the connecting procedure does not involve the necessity of upwardly or downwardly moving the tank to eliminate the need to use a large device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view partly broken away and showing a filling machine of the present invention in its entirety;

FIG. 2 includes enlarged fragmentary views in section showing a filling liquid tank in the filling machine;

FIG. 3 is a view in vertical section of a filling nozzle in the machine;

FIG. 4 is a view in vertical section of a device for cleaning the filling machine;

FIG. 5 is a plan view of the cleaning device;

FIG. 6 is a diagram illustrating an operation for applying suction to the interior of the tank;

FIG. 7 is a diagram illustrating a cleaning operation by the cleaning device;

FIG. 8 is a diagram illustrating another cleaning operation by the device;

FIG. 9 is a diagram illustrating another cleaning operation by the device; and

FIG. 10 is a diagram illustrating still another cleaning operation by the device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the invention will be described with reference to the drawings.

FIG. 1 shows a rotary vacuum filling machine which comprises a vertical rotary support shaft 12 provided upright on a base 11, a filling liquid tank 13 having a bottom wall supported by the upper end of the support shaft 12, a container transport table 14 positioned at a predetermined distance downward from the bottom wall of the tank 13 and secured to an intermediate portion of the height of the shaft 12, a plurality of filling nozzles 15 mounted on the bottom wall peripheral portion of the tank 13 and arranged at a given spacing, and liftable container supports 16 mounted on the peripheral portion of the table 14 and positioned immediately below the respective filling nozzles 15.

A collection pipe connecting adapter 17 is provided for every two filling nozzles 15.

The tank 13 has a top wall which is centrally provided with an opening portion 21 in the form of an upwardly projecting tube. The opening portion 21 has an open upper end covered with a closure 22. An annular trough 23 for collecting a wash liquor is provided around the opening portion 21.

With reference to FIG. 2, a slip ring 28 of rigid synthetic resin and a seal ring 24 of soft synthetic resin inside thereof are interposed between the upper end of the opening portion 21 and the lower surface of the closure 22 over the entire periphery of the opening portion. Recesses 28a are formed in the upper face of the slip ring 28 at suitable locations. An eccentric ring 25 for lifting the closure 22 is disposed in each recess 28a. The eccentric ring 25 has connected thereto a rotating rod 27 provided with a knob 26 and rotatably attached to the closure 22.

The eccentric ring 25 is rotated in contact with the bottom of the recessed portion 28a so as to direct an eccentric portion downward, whereby the closure 22 is lifted to form a wash liquor collecting clearance between the slip ring 28 and the closure

22 (as shown in FIG. 2, (b)).

With reference to FIG. 1 again, the closure 22 is centrally provided with an upwardly projecting connecting tubular portion 31 having a top wall. A vertical cleaning pipe 33 equipped with a spray nozzle 32 at its lower end extends through and is attached to the top wall. A vertical liquid supply pipe 34 at the right side of the tubular portion 31 and a vertical rodlike level sensor 35 at the left side thereof extend through and are attached to the closure 22.

A liquid supply three-way change-over valve 36 has one channel in communication with an open upper end of the cleaning pipe 33. A first liquid feed pipe 37 has one end connected to an unillustrated liquid feed pump and the other end connected to one of the two other channels of the valve 36. A first shutoff valve 38 has one channel communicating with an open upper end of the liquid supply pipe 34 and the other channel in communication with the other channel of the change-over valve 36.

The filling liquid tank 13 is provided with a suction blower 39 and a gas-liquid separation tank 40. The blower 39 has a suction opening communicating with one channel of a collection three-way change-over valve 41. Two valves, i.e., second and third shut-off valves 42, 43, each have one channel in communication with the separation tank 40 through the top wall thereof. A fourth shutoff valve 44 has one channel communicating with the tank 40 through its bottom wall. A first collection pipe 45 has one end connected to an unillustrated collection pump and the other end connected to one of the two other channels of the three-way change-over valve 41. A first suction pipe 46 has one end connected to the remaining channel of the valve 41 and the other end connected to the other channel of the second shutoff valve 42. A second suction pipe 47 has one end connected to the other channel of the third shutoff valve 43 and the other end connected to the tubular portion 31 of the tank 13. A second liquid feed pipe 48 having one end connected to the unillustrated liquid feed pump is connected to the other channel of the fourth shutoff valve 44.

An annular second collection pipe 49 is secured to a radially intermediate portion of the container transport table 14 on its upper surface. The collection pipe 49 locally has a J-shaped connection pipe 50 extending downward and connected to the collection pump by unillustrated means.

As shown in detail in FIG. 3, each filling nozzle 15 comprises a vertical tubular nozzle body 61 having an open upper end in communication with the interior of the tank 13 and suspended by the bottom wall of the tank 13, a vertical air vent pipe 62 fixedly extending through the nozzle body 61

vertically and having a projection 62a projecting downward from the nozzle body 61, a vertically movable discharge pipe 64 provided around the downward projection 62a, a seat ring 63 formed on the lower end outer face of the air vent pipe 62 and integral with the pipe 62 for the discharge pipe 64 to bear on, a compression coiled spring 66 biasing the discharge pipe 64 downward, and a tubular packing 67 extending between and attached to the nozzle body 61 and the discharge pipe 64.

The nozzle body 61 comprises an upper large-diameter portion 72 and an upper small-diameter portion 73 extending downward from the portion 72 with a stepped portion 71 formed therebetween. The upper large-diameter portion 72 is internally formed at its upper end with a stay 75 having at its inner end a mount sleeve 74 for the air vent pipe. The large-diameter portion 72 has an upper male screw 76 at its lower end.

The upper small-diameter portion 73 has six windows 77 each in the form of a vertically elongated slit and arranged at a spacing circumferentially of the portion 73. The wash liquor flows into or out of a space between the portion 73 and the packing 67 through these windows 77.

The air vent pipe 62 has a stepped portion 78 at an intermediate portion of its height and an annular groove 79 spaced apart upward from the stepped portion 78 by a distance corresponding to the height of the mount sleeve 74. The portion of the air vent pipe 62 above the stepped portion 78 is inserted through the mount sleeve 74, with the stepped portion 78 in contact with the lower face of the sleeve 74, and a retainer 80 is fitted in the annular groove 79, whereby the air vent pipe 62 is secured to the nozzle body 61.

The discharge pipe 64 comprises a lower large-diameter portion 82 and a lower small-diameter portion 83 extending downward from the portion 82 with a lower stepped portion 81 formed therebetween. The lower large-diameter portion 82 has an outside diameter permitting the portion 82 to come into contact with the opening edge of the container to be filled with a liquid. The lower small-diameter portion 83 has an outside diameter permitting the portion 83 to be inserted into the opening of the container. The large-diameter portion 82 has an upper surface outer periphery which is at the same level as the lower end face of the upper small-diameter portion 73. The lower large-diameter portion 82 is formed on its inner surface with an inward arm 85 provided with an air vent pipe guide sleeve 84 at its inner end. The sleeve 84 is fitted around the vent pipe 62. The arm 85 has an upper surface which is at a slightly lower level than the outer periphery of upper surface of the lower large-diameter portion 82, and the base portion of upper surface of the arm 85 provides a contact

face 85a for the lower end face of the upper small-diameter portion 73. A clearance C for permitting the discharge pipe 64 to move upward or downward is formed between the contact face 85a and the lower end face of the upper small-diameter portion 73. The lower large-diameter portion 82 has a lower male screw 86 at its upper end.

A ring 65 of rubber or like elastic material for contact with the opening edge of the container is fitted around the lower small-diameter portion 83, with the upper surface of the ring in contact with the lower stepped portion 81.

The spring 66 is inserted in the nozzle body 61 around the air vent pipe 62 and held between the stay 75 and the arm 85.

The packing 67 is made of rubber or like elastic material and thereby rendered stretchable, and has upper and lower flanges 91, 92 at its respective ends and an annular intermediate portion 93, C-shaped in cross section, for providing an allowance for stretching. With the packing 67 provided around the upper small-diameter portion 73, an upper cap nut 94 is screwed on the upper male screw 76 to press the upper flange 91 against the upper stepped portion 71, and a lower cap unit 95 is screwed on the lower male screw 86 to press the lower flange 92 against the lower stepped portion 81. Upper and lower thrust washers 96, 97 of metal are interposed respectively between the upper flange 91 and the top wall of the cap nut 94 and between the lower flange 92 and the top wall of the cap unit 95. The packing 67 is prevented from rotating with the nuts 94, 95 by these thrust washers 96, 97 when the nuts 94, 95 are tightened up.

As shown in detail in FIGS. 4 and 5, the collection pipe connecting adapter 17 comprises a liquid receptacle 111 in the form of a flat horizontally elongated box, a laterally projecting conduit 112 integral with the receptacle 111 in communication with the interior thereof, and a tubular connector 212 having removably joined to one end thereof the forward end of the conduit 112.

The receptacle 111 has a top wall which is formed with two inlet portions 113 arranged side by side for connecting thereto the discharge ends of the respective two filling nozzles 15. The inlet portion 113 has an upper end having a seal ring 114 attached thereto.

The conduit 112 externally has a flange 117 at a predetermined distance from its forward end and further has a spigot 118 at the portion thereof forward from the flange 117. An O-ring 119 is provided around the spigot 118.

An L-shaped suspending bracket 115 is secured to a side wall of the receptacle 111. The bracket 115 has an upper end with a buckle lock 116 attached thereto. The buckle lock 116 has an engageable arm 121 and a lever 122. The arm 121

is engageable with a hook 123 on the tank 13 when the lever 122 is in a raised state although not shown, and the bracket 115 is locked in a pulled-up state to the tank 13 when the lever 122 is laid down.

The connector 212 has at the above-mentioned one end thereof a socket 211 corresponding to the spigot 118. The other end of the the connector 212 serves as a pipe connection end 221, which is connected to the second collection pipe 49 by a flexible pipe 222.

The connector 212 is provided at an intermediate portion of its length with a pair of support pins 213 projecting outward in directions opposite to each other. These support pins 213 are rotatably supported by support blocks 215 suspended from the bottom wall of the tank 13 by a channel bracket 214.

For a filling operation, the suction blower 39 operates to aspirate air from the interior of the tank 13 through the channel indicated by arrows in FIG. 6, whereby the interior of the tank 13 is maintained at a negative pressure. On the other hand, a filling liquid sent forward through the first liquid pipe 37 is held within the tank 13 at a constant level based on an output signal from the level sensor 35.

With the rotation of the support shaft 12, the tank 13 and the table 14 rotate, but the closure 22 remains unrotated. In this case, the slip ring 28 rotates with the tank 13 in sliding contact with the closure 22. This assures the tank 13 of smooth rotation.

When a container is supplied onto the container support 16, the support 16 moves upward, bringing the opening edge of the container into contact with the contact ring 65 to push the ring upward, whereby the discharge pipe 64 is forced upward along with the contact ring 65. This releases the lower end of the discharge pipe 64 from the seat ring 63 and opens the discharge end. On the other hand, air is discharged from inside the container through the air vent pipe 62, whereby the interior of the container is given the same negative pressure as in the tank 13, permitting delivery of the filling liquid from the discharge end into the container. Upon the liquid inside the container reaching the same level as the lower end of the air vent pipe 62, no portion of the filling liquid is delivered into the container, but the liquid discharged ascends the air vent pipe 62. The discharge of the liquid from the nozzle 15 is discontinued upon the liquid inside the vent pipe 62 reaching the same level as the liquid level within the tank 13. The container support 16 thereafter lowers to lower the container. The discharge pipe 64 therefore moves down, bringing its lower end into contact with the seat ring 63, whereby the discharge end is closed. At this time, the filling liquid

remains in the air vent pipe 62, whereas the remaining liquid is forced up into the tank 13 by the negative pressure inside the tank 13.

The filling machine is cleaned by the following operation.

In preparation for cleaning, the adapters 17 are set in position for the filling nozzles 15 in the following manner. With the contact ring 65 removed from each nozzle 15, the spigot 118 of the conduit 112 is inserted into the socket 211 of the connector 212 as directed obliquely downward as indicated in a broken line in FIG. 4, and the bracket 115 is raised and fastened to the tank 13 with the buckle lock 116. This moves the discharge pipe 64 upward to open the discharge end. Next, each eccentric ring 25 is rotated to lift the closure 22 to form a clearance between the slip ring 24 and the closure 22 as previously stated. The connection pipe 50 of the second collection pipe 49 is then connected to the collection pump.

When the preparation procedure has been thus completed, the following five steps are executed one after another.

With reference to FIG. 7 showing the first step, the second shutoff valve 42 and the fourth shut-off valve 44 are opened, the collection three-way change-over valve 41 is so switched as to connect the first collection pipe 45 to the first Suction pipe 46, and the liquid feed pump and the collection pump are operated, whereby a wash liquor is supplied to the gas-liquid separation tank 40 and the first suction pipe 46 through the second liquid feed pipe 48 and collected via the first collection pipe 45 as indicted by arrows in FIG. 7.

With reference to FIG. 8 showing the second step, the second shutoff valve 42 is closed and the third shutoff valve 43 is opened to supply the wash liquor to the gas-liquid separation tank 40 as in the first step. At this time, the wash liquor flows through the second suction pipe 47 into the filling liquid tank 13. The wash liquor flowing into the tank 13 flows down the nozzle 15 into the receptacle 111 via the nozzle discharge end, further flows through the conduit 112 and the connector 212 and is collected by way of the second collection pipe 49.

In the third step illustrated in FIG. 9, the liquid supply three-way change-over valve 36 is so manipulated as to bring the first liquid feed pipe 37 into communication with the first shutoff valve 38, which is then opened to supply the wash liquor via the first liquid feed pipe 37. The liquid supplied flows through the liquid supply pipe 34 into the tank 13 and is collected in the same manner as in the second step.

In the fourth step illustrated in FIG. 10, the change-over valve 36 is manipulated to bring the first liquid feed pipe 37 into communication with

the cleaning pipe 33 to similarly supply the wash liquor via the first liquid feed pipe 37. The liquor flows down the cleaning pipe 33 and is sprayed through the nozzle 32. This cleans the entire interior of the tank 13 and also the opposed peripher-

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ies of the closure 22 and the opening portion 21. In the fifth step, the collection pump is stopped, and the change-over valve 36 is manipulated in the same manner as in the third step to open the first shutoff valve 38 and supply the wash liquor to the tank 13 via the first liquid feed pipe 37 and the liquid supply pipe 34. Upon the liquid level within the tank 13 rising to a level higher than the upper end of the air vent pipe 62, the collection pump is operated. This forces the wash liquor within the tank 13 to flow down the filling nozzle 15 continuously to clean the entire interior of the nozzle 15, especially the inside of the air vent pipe 62.

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The five steps described are executed repeatedly using different kinds of wash liquors, for example, hot water, alkali solution, etc.

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On completion of the above procedures, water serving as a wash liquor is finally supplied to the tank 13 through the liquid supply pipe 34 with the collection pump held out of operation as in the fifth step. Water is continuously supplied until it overflows the tank 13. The overflow is collected by the trough 23.

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When the cleaning operation has been completed in this way, the closure 22 is closed, and each adapter 17 is removed from the filling nozzle 13 by a procedure reverse to the setting procedure described, whereby the machine is made ready for a filling operation.

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Claims

1. A device for cleaning a filling machine having a filling liquid tank 13 and a filling nozzle 15 attached to a bottom wall of the tank 13 in suspension, the device comprising:

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means for supplying a wash liquor to the tank 13, and collection means for collecting through the filling nozzle 15 the wash liquor supplied to the tank 13,

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the cleaning device being characterized in that the collection means comprises a liquid receptacle 111 having an inlet portion 113 connectable to a discharge end of the filling nozzle 15, a laterally projecting conduit 112 having an inlet end integral with a side wall of the receptacle 111 and communicating with the interior of the receptacle 111, a tubular connector 212 having removably joined to one end thereof an outlet end of the conduit 112 and connected at the other end thereof to a collection pipe 49, support means supporting the connector 212 upwardly or downwardly pivot-

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ally movably at one side of the filling nozzle 15 so that the inlet portion 113 can be removably connected to the nozzle discharge end with the conduit 112 joined to the connector 212, and means for removably connecting the receptacle 111 to the tank 15 with the inlet portion 113 connected to the nozzle discharge end.

2. A cleaning device as defined in claim 1 wherein the conduit 112 has a flange 117 externally thereon close to the outlet end and a spigot 118 extending from the flanged portion to the outlet end, and the connector 212 has at said one end thereof a socket 211 corresponding to the spigot 118.

3. A cleaning device as defined in claim 1 wherein the support means comprises a pair of horizontal pins 213 projecting outward from the outer peripheral surface of the connector 212 in directions opposite to each other, and support blocks 215 rotatably supporting the horizontal pins 213 and fixedly suspended from the bottom wall of the tank 13.

4. A cleaning device as defined in claim 1 wherein the connecting means comprises a bracket 115 fixedly upstanding from the side wall of the receptacle 111 and having an upper end extend to the bottom wall of the tank 13 when the inlet portion 113 is connected to the nozzle discharge end, and a buckle lock 116 for attaching the upper end of the bracket 115 to the bottom wall of the tank 13, and the buckle lock 116 comprises a hook 123 fixed to the bottom wall of the tank 13, and an engageable arm 121 and a lever 122 both attached to the bracket 115, the arm 121 being engageable with the hook 123 when the lever 122 is in a raised state, the bracket 115 being lockable in a pulled-up state to the tank 13 when the lever 122 is laid down.

5. A cleaning device as defined in claim 1 wherein the tank 13 is fixed to an upper end of a vertical rotary support shaft 12, a container transport table 14 being secured to the support shaft 12 at an intermediate portion of its height, the collection pipe 49 being fixed to the transport table 14, the connector 212 and the collection pipe 49 being interconnected by a flexible pipe 222.

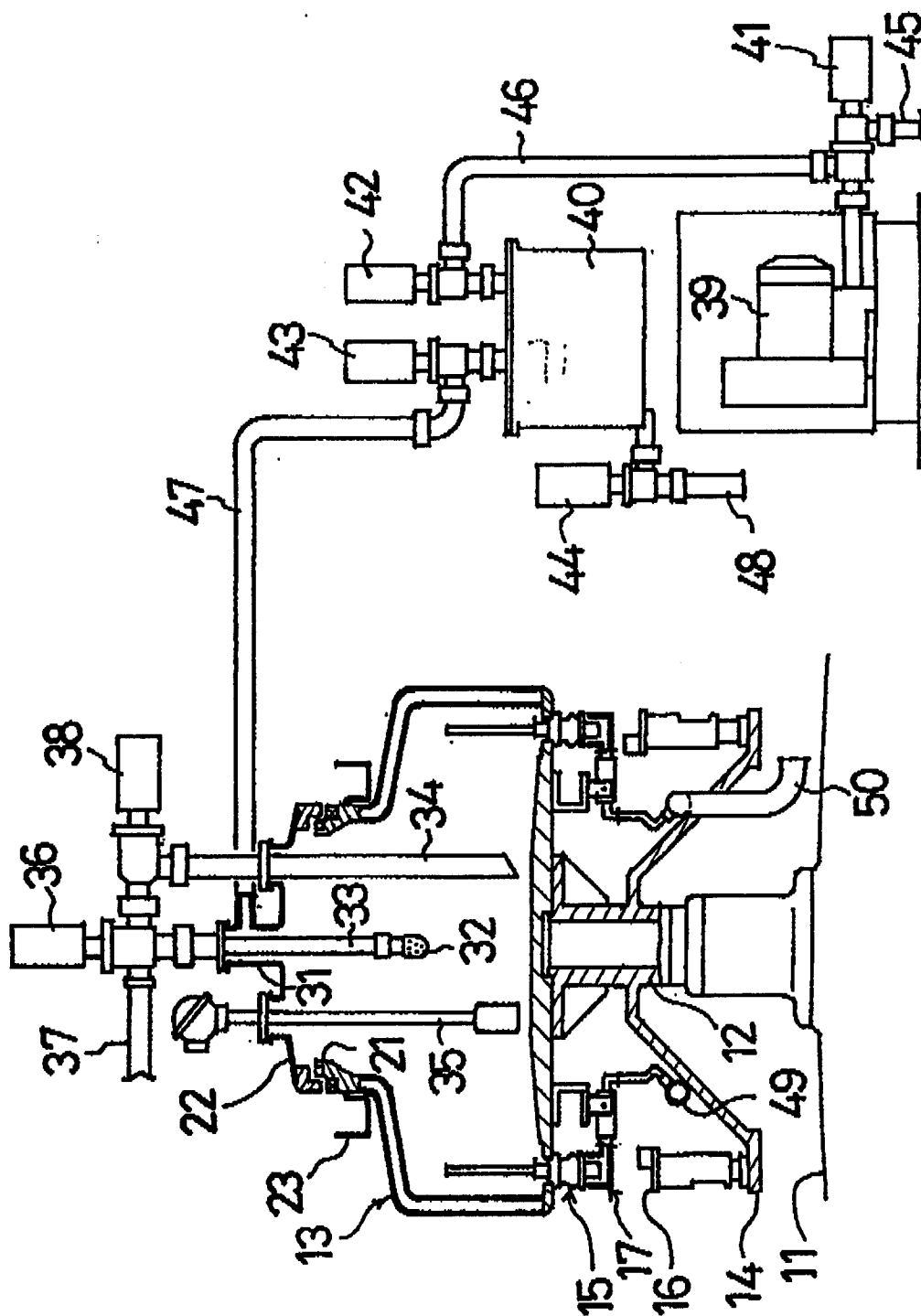
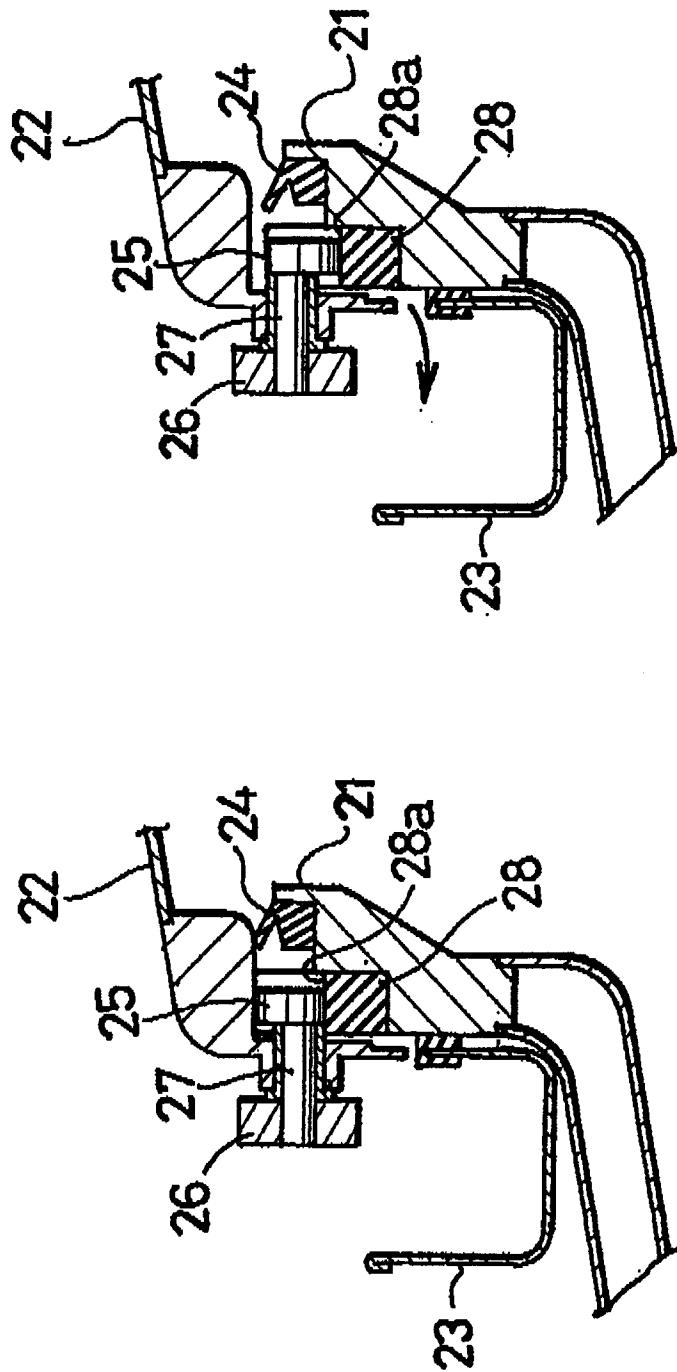


FIG.1



(b)

(a)

FIG. 2

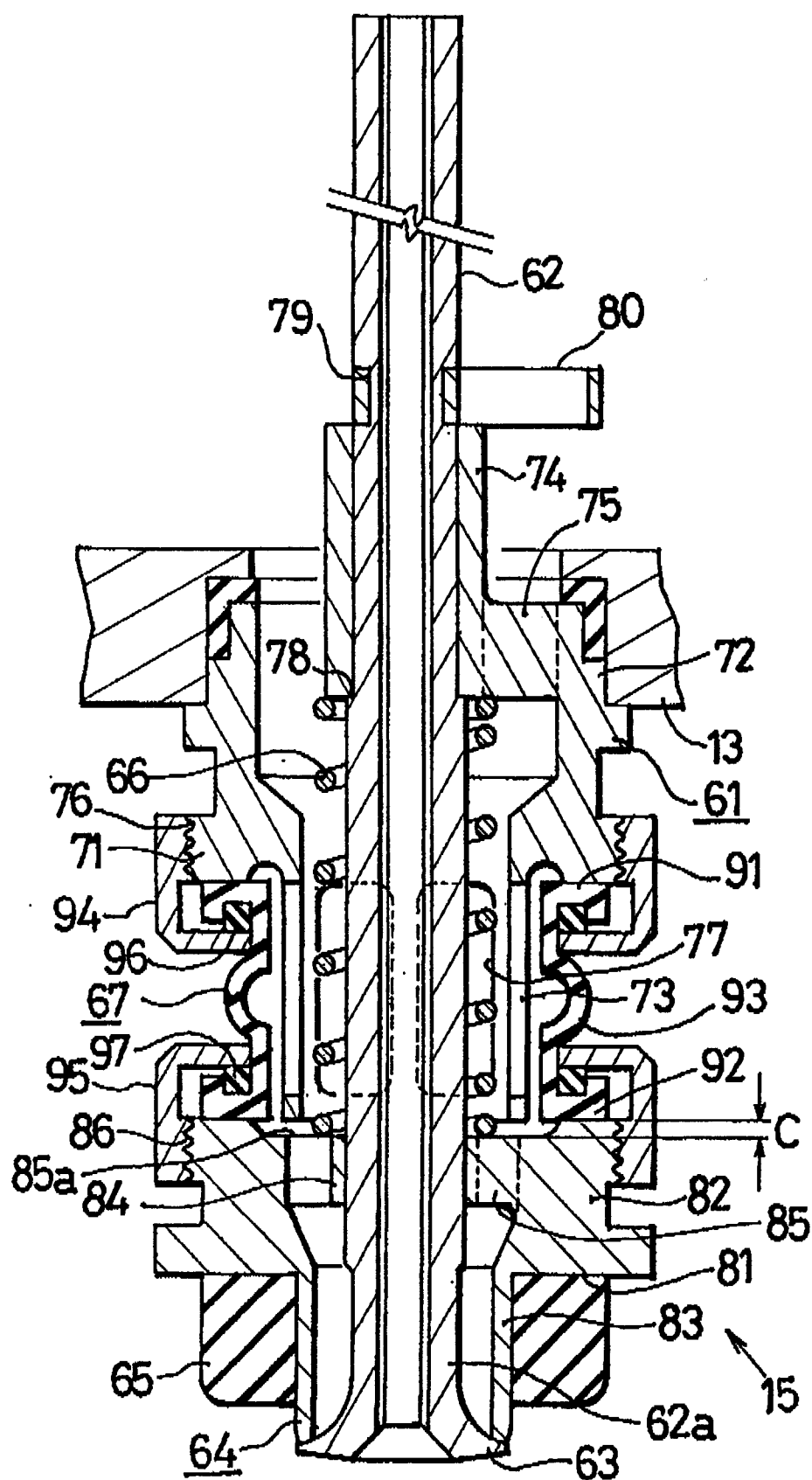
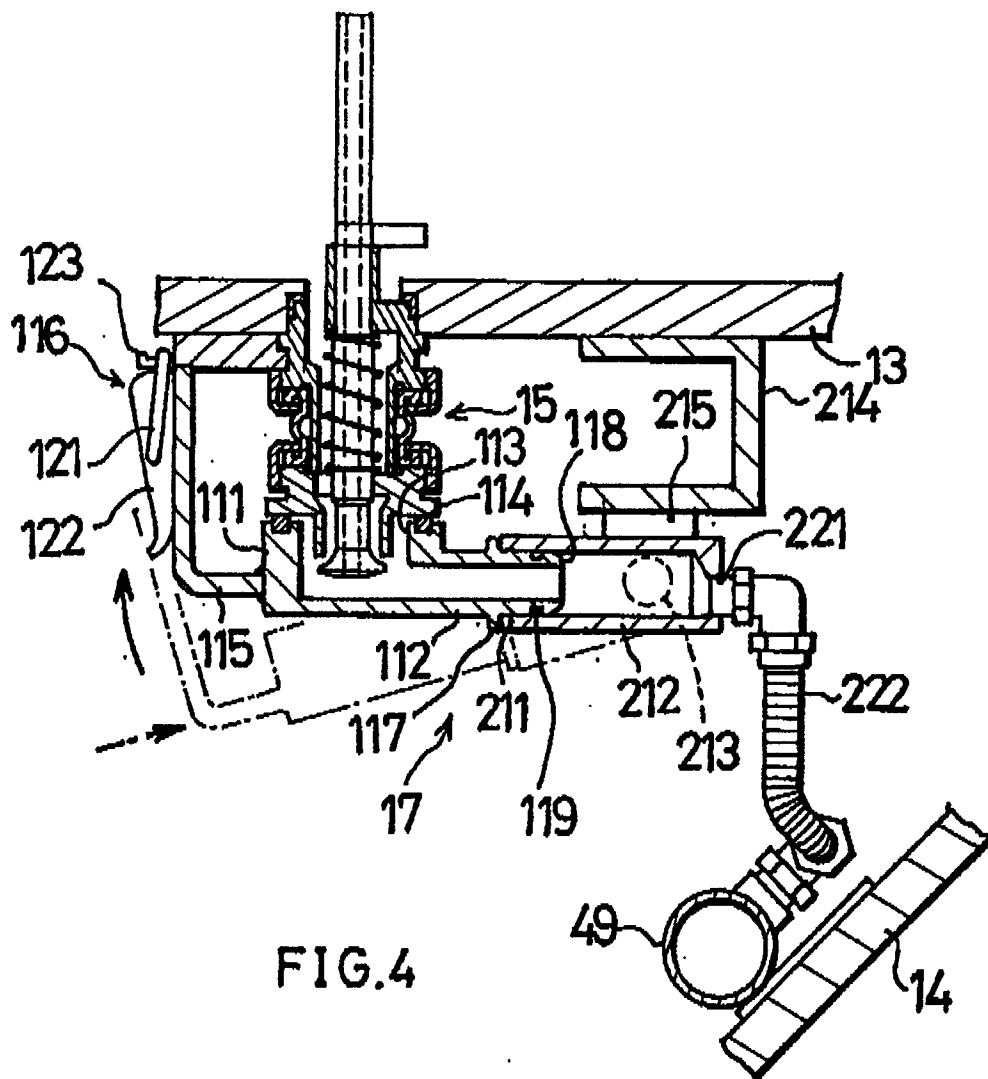
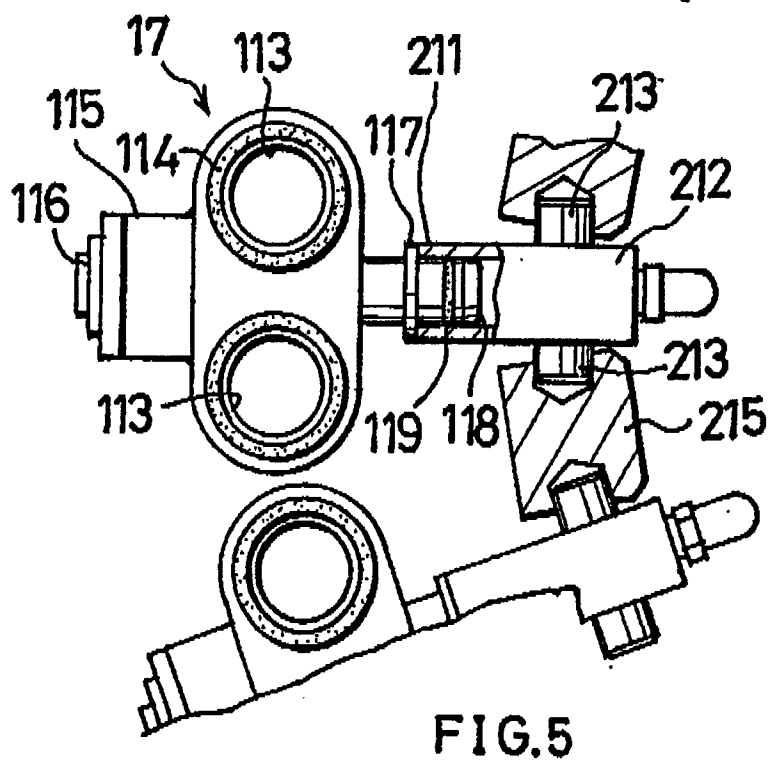
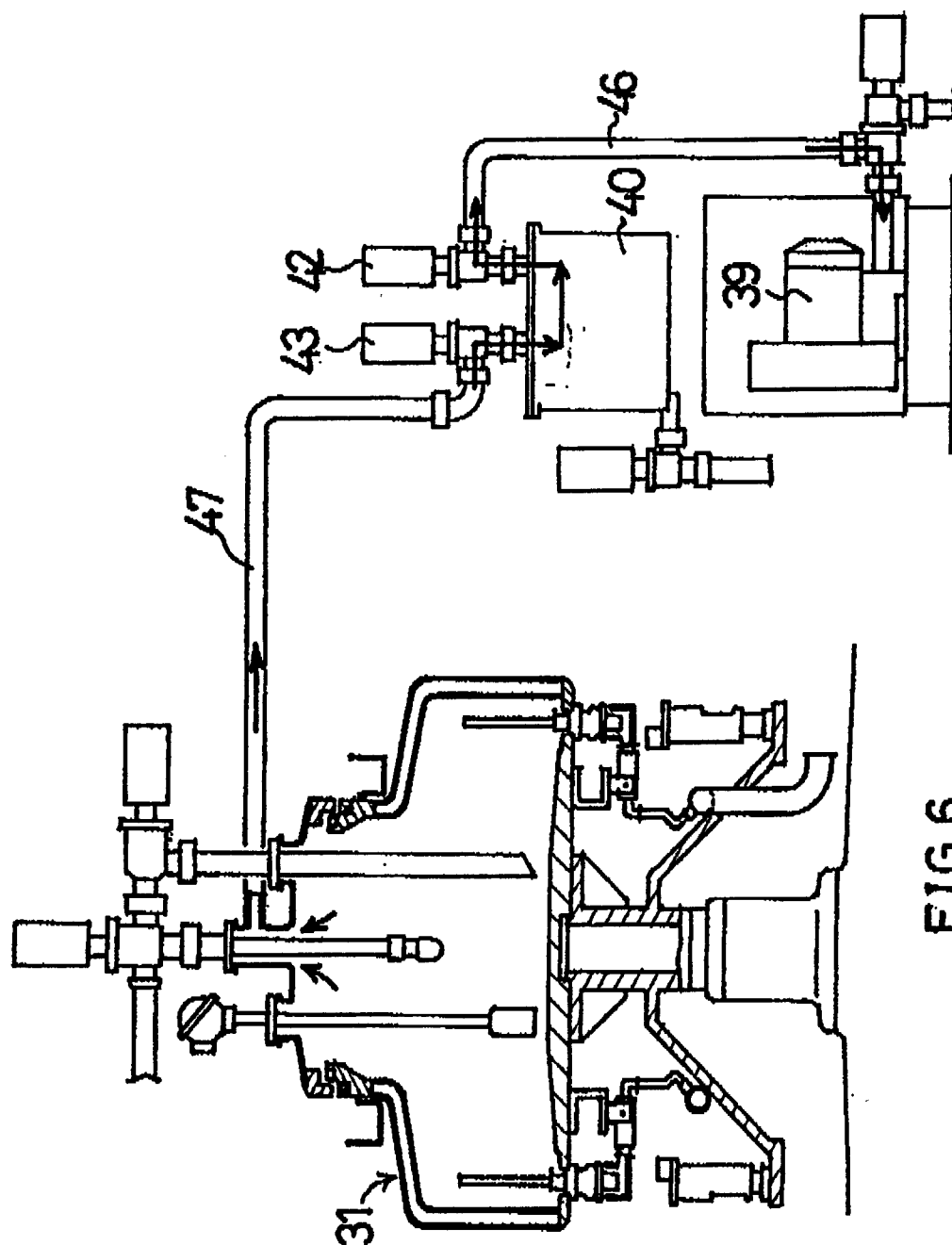
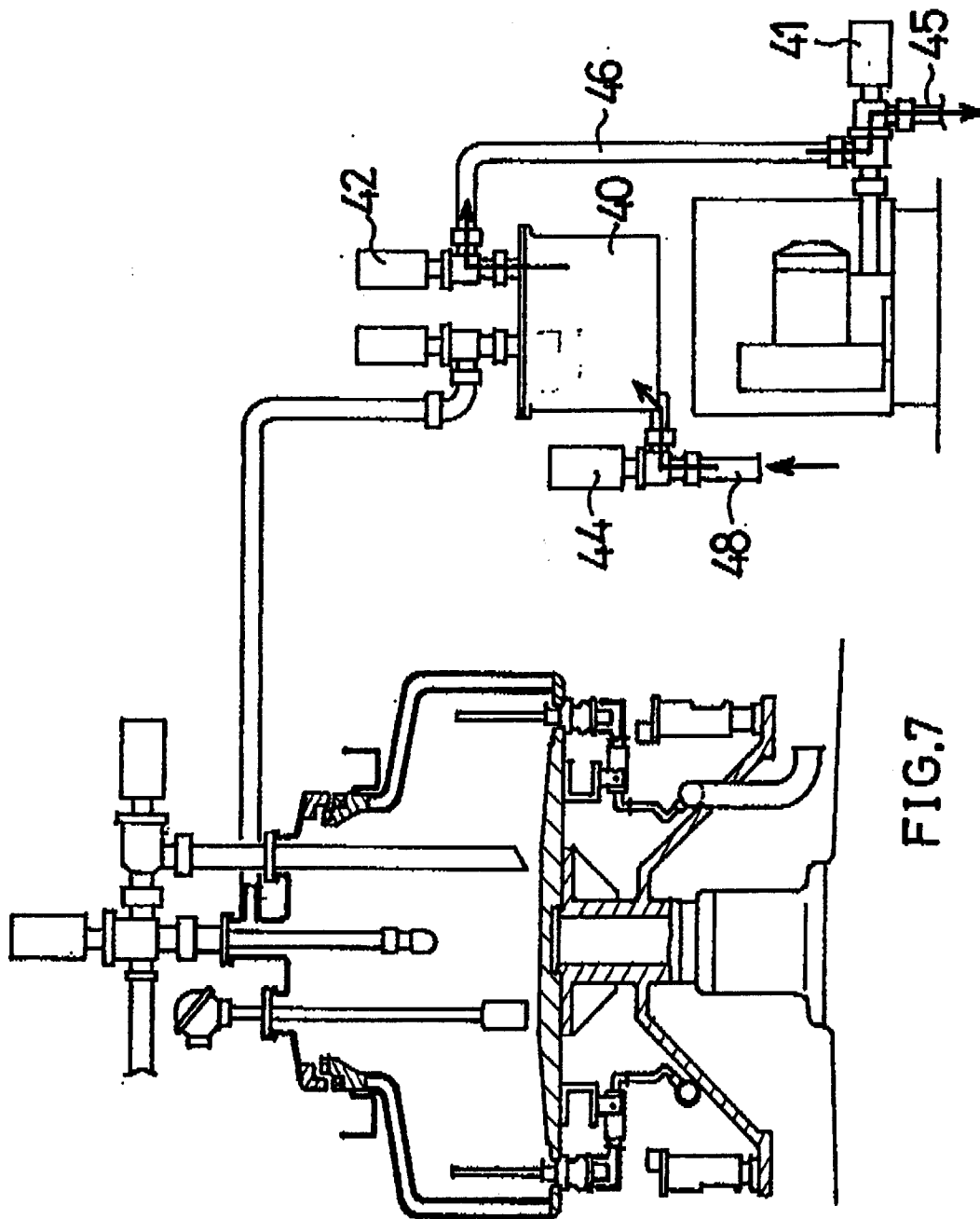
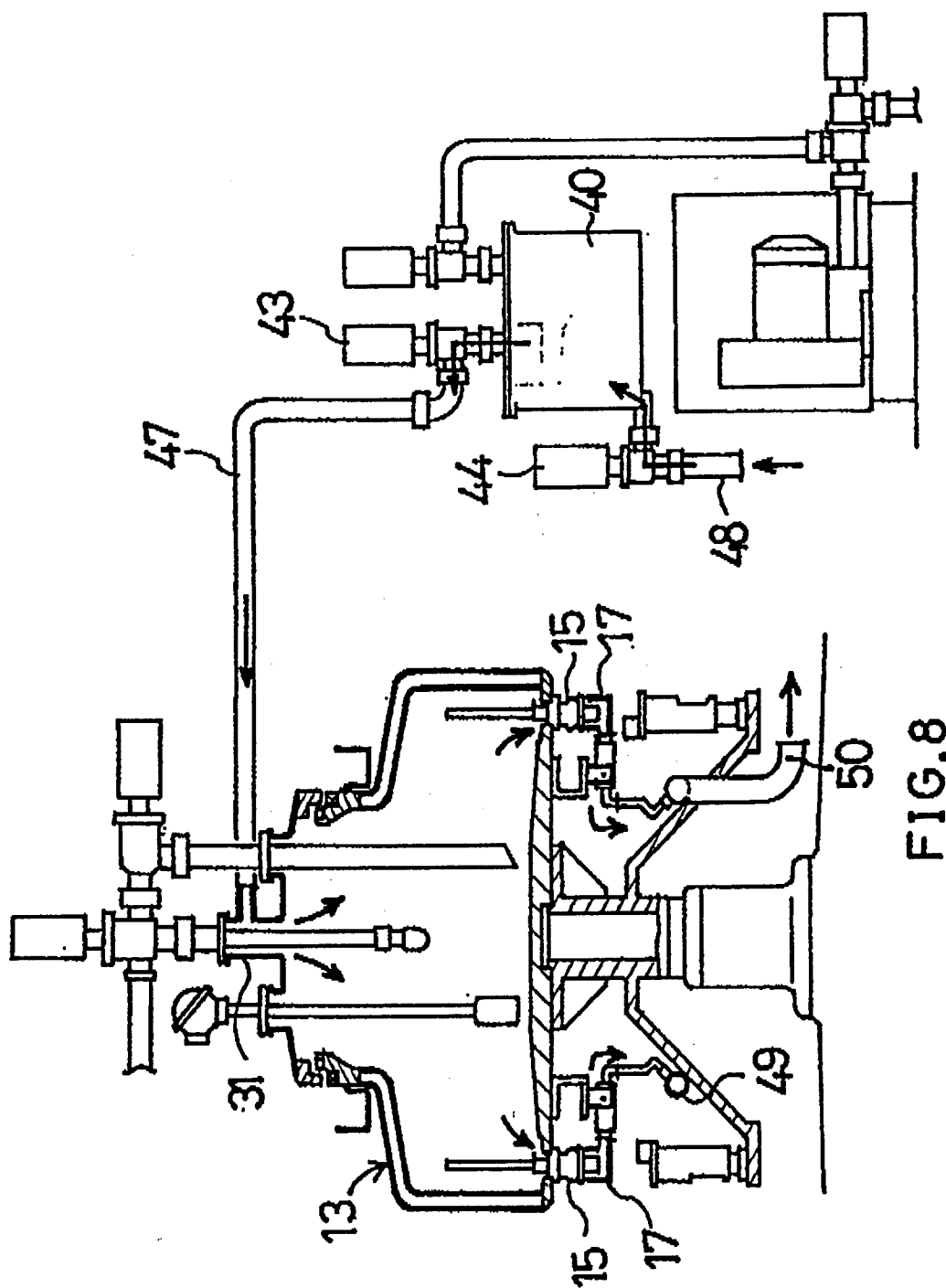


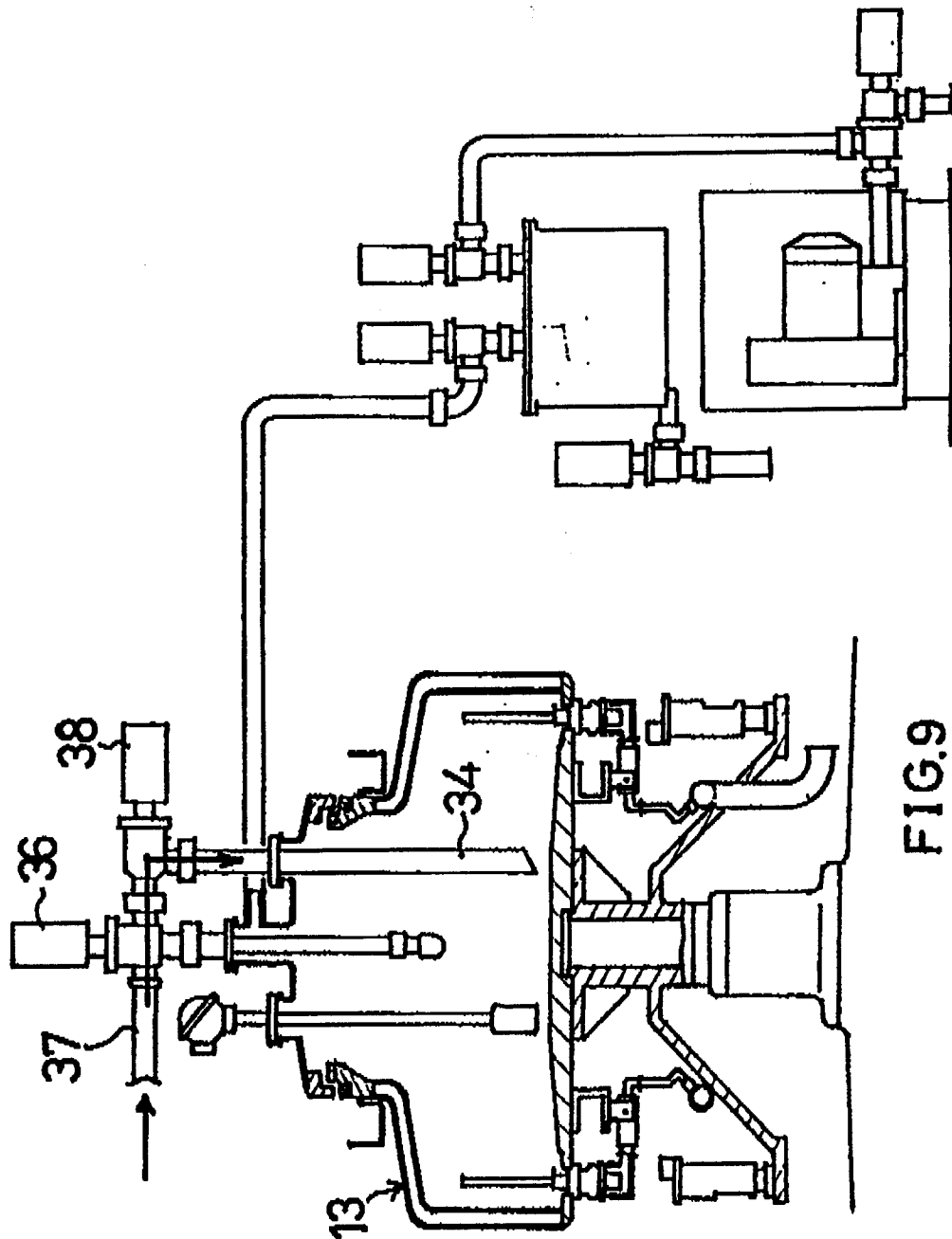
FIG.3

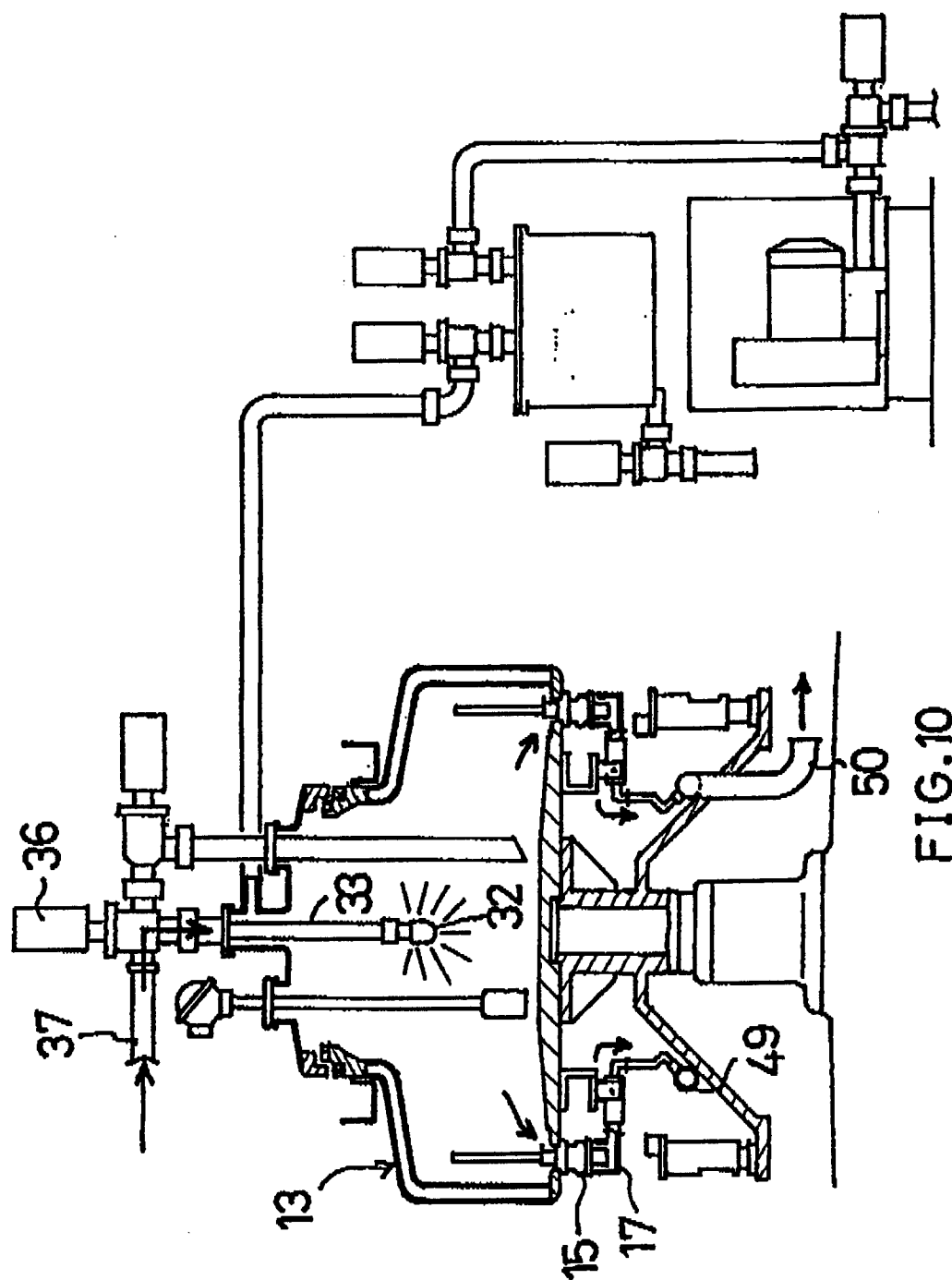














European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0259

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 162 968 (SHIKOKU KAKOOKI CO LTD) * page 12, line 8 - page 14, line 11; figures 13,14 *	1,2,5	B67C3/00
A	---	3,4	
Y	DE-A-3 722 495 (HOLSTEIN UND KAPPERT AG) * column 5, line 12 - line 55; figure 2 *	1,2,5	
A	---		
A	US-A-4 559 961 (F.E. ANDERSON EZ AL) * column 3, line 53 - column 4, line 5 * * column 4, line 21 - line 35 * * figures 4-6 *	1-5	
A	---		
A	EP-A-0 120 171 (SERAC S.A.) * page 4, line 24 - page 6, line 11; figure 2 *	1	

			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B67C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06 MAY 1993	Examiner LILIMPAKIS E.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			