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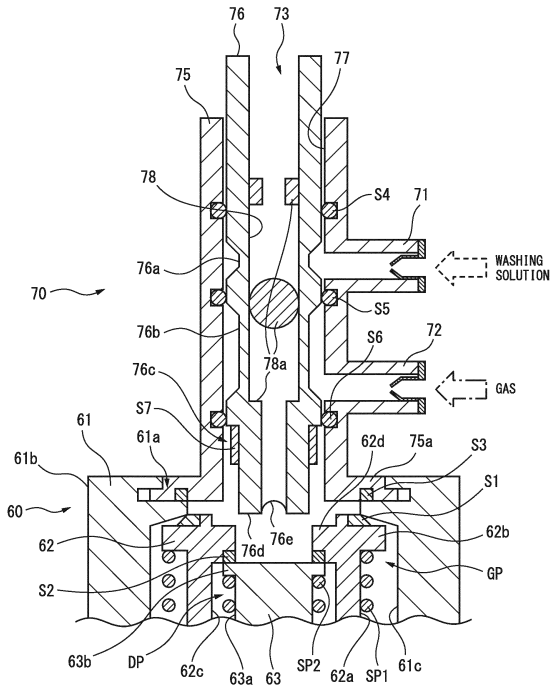
(54) DISPENSING HEAD

(57) A dispensing head 70 comprising a case 75 and a plunger 76. The case 75 has inlets 71 and 72 and seal means S5 and S6. The plunger 76 has grooves 76a and 76b. In a first connection state, the seal means S5 and S6 slidingly contact the outer circumferential surface of the plunger 76 and both of the inlets 71 and 72 are cut off from the inside of the drink container and through hole 78. In a second connection state, clearances are formed between the seal means S5 and the groove 76a and between the seal means S6 and the groove 76b and both of the inlets 71 and 72 fluidly communicate with the through hole 78, and are cut off from the inside of the drink container. In a third connection state, the seal means S5 slidingly contacts the outer circumferential surface of the plunger 76, a clearance is formed between the seal means S6 and the groove 76b, the inlet 71 is cut off from the inside of the drink container and through hole 78, and the inlet 72 is fluidly communicated with the through hole 78 through the inside of the drink container.

FIG. 3



EP 3 904 276 A1

Description

FIELD

[0001] The present application relates to a dispensing head.

BACKGROUND

[0002] In general, it is known to attach a dispensing head to a drink container storing for example beer or another drink and to serve the drink from a drink server connected to the dispensing head. The dispensing head and drink server are sometimes washed, for example, periodically or as needed. In the past, various configurations have been known for washing these dispensing head and drink server. For example, Patent Literature 1 discloses a drink dispenser provided with a drink container containing a drink, a dispensing head attached to the drink container, and a dispenser body connected to the dispensing head. The dispensing head has an inlet and outlet. Further, the dispensing head has a first communication path connecting the inlet and outlet through the inside of the drink container and a second communication path connecting the inlet and outlet without going through the inside of the drink container. The inlet is connected through a fluid selecting means to a carbon dioxide gas tank and a washing solution supplying means and is configured so that by switching the fluid selecting means, one of carbon dioxide and a washing solution is received. Further, the dispensing head has an operating lever for switching between the first communication path and the second communication path and a tilt sensor for outputting a signal to the outside in accordance with a tilted state of the operating lever. The tilt sensor, for example, is configured so as to output a signal to the outside when the second communication path is selected by the operating lever. The fluid selecting means is configured to supply the washing solution to the inlet only if a signal is output from the tilt sensor (that is, only if the inlet and discharge outlet are connected without going through the inside of the drink container). If the inlet and discharge outlet are connected through the inside of the drink container by such a configuration, the mistaken supply of the washing solution to the inside of the drink container is prevented.

[CITATIONS LIST]

[PATENT LITERATURE]

[0003] [PTL 1] Japanese Unexamined Patent Publication No. 2006-36221

SUMMARY

[SOLUTION TO PROBLEM]

[0004] In the drink dispenser of PTL 1, to prevent the washing solution from mistakenly being supplied to the inside of the drink container, the dispensing head has a tilt sensor attached to it. However, by using a tilt sensor, control of the drink dispenser may become complicated. Further, the manufacturing costs increase. Further, the dispensing head is sometimes placed in an environment where it may be contaminated by the drink or splashed with water. Electronic components like a tilt sensor may malfunction due to deposition of drink or water.

[0005] The present invention has as its object to provide a dispensing head which solves the above such defect while is able to prevent a washing solution from mistakenly being supplied to the inside of the drink container.

[SOLUTION TO PROBLEM]

[0006] One embodiment of the present disclosure is a dispensing head attached to a spear valve of a drink container, the dispensing head comprising a case to be fixed to the spear valve, which case has a first through hole fluidly communicating with an inside of the spear valve, and a plunger sliding inside the first through hole of the case, which plunger has a second through hole fluidly communicating with an inside of the spear valve, the case comprising a first fluid inlet fluidly communicating with the first through hole, a first seal means arranged in the first through hole at a downstream side from the first fluid inlet and slidingly contacting the outer circumferential surface of the plunger, a second fluid inlet fluidly communicating with the first through hole at a downstream side from the first seal means, and a second seal means arranged in the first through hole at a downstream side from the second fluid inlet and slidingly contacting the outer circumferential surface of the plunger, the plunger comprising a first groove for forming a clearance between the outer circumferential surface of the plunger and the first seal means, a second groove for forming a clearance between the outer circumferential surface of the plunger and the second seal means, a first engaging part configured to engage with a gas-use valve of the spear valve, and a second engaging part configured to engage with a drink-use valve of the spear valve, the dispensing head having a first connection state, a second connection state, and a third connection state, in the first connection state, the first engaging part and the second engaging part of the plunger respectively not engaging with the gas-use valve and the drink-use valve of the spear valve, and the first seal means and the second seal means both slidingly contacting the outer circumferential surface of the plunger, whereby the first fluid inlet and the second fluid inlet both are cut off from the inside of the drink container and the second through hole of the plunger, in the second connection state, the first engaging part and

the second engaging part of the plunger respectively not engaging with the gas-use valve and the drink-use valve of the spear valve, and clearances being formed between the first seal means and the first groove and between the second seal means and the second groove, whereby both the first fluid inlet and the second fluid inlet fluidly communicate with the second through hole of the plunger and are cut off from the inside of the drink container, in the third connection state, the first engaging part and the second engaging part of the plunger respectively pushing open the above gas-use valve and the above drink-use valve of the spear valve, and the first seal means slidingly contacts the outer circumferential surface of the plunger and a clearance is formed between the second seal means and the second groove, whereby the first fluid inlet is cut off from the inside of the drink container and the second through hole of the plunger while the second fluid inlet fluidly communicates through the inside of the drink container with the second through hole of the plunger.

[0007] In the dispensing head according to one embodiment of the present disclosure, the case has two fluid inlets (first fluid inlet and second fluid inlet). Further, the dispensing head has three connection states (first, second, and third connection states). According to the configuration of a dispensing head according to one embodiment of the present disclosure, the first fluid inlet is cut off from the inside of the drink container and the second through hole of the plunger in the first connection state and the third connection state among the three connection states. Further, the first fluid inlet is fluidly communicated with the second through hole of the plunger even in the second connection state, but is cut off from the inside of the drink container. That is, the first fluid inlet is cut off from the inside of the drink container in all of the three connection states. Therefore, by running the washing solution from the first fluid inlet and running gas from the second fluid inlet, the washing solution can be mechanically prevented from flowing to the inside of the drink container. Therefore, it is possible to reliably prevent the washing solution from being mistakenly supplied to the inside of the drink container.

[ADVANTAGEOUS EFFECTS OF INVENTION]

[0008] According to one embodiment of the present disclosure, it becomes possible to provide a dispensing head able to prevent a washing solution from being mistakenly supplied to the inside of a drink container.

BRIEF DESCRIPTION OF DRAWINGS

[0009]

FIG. 1 is a schematic view of the configuration of a drink supply system including a dispensing head according to the present embodiment.

FIG. 2 is a schematic view of the configuration of a drink supply system showing an internal configuration of a washing apparatus.

FIG. 3 is a schematic cross sectional view of a dispensing head in a first connection state.

FIG. 4 is a schematic cross sectional view of a dispensing head in a second connection state.

FIG. 5 is a schematic cross sectional view of a dispensing head in a third connection state.

DESCRIPTION OF EMBODIMENTS

[0010] Below, referring to the attached drawings, a dispensing head according to the present embodiment will be explained. Throughout the plurality of figures, similar or corresponding elements will be assigned the same reference notations and overlapping explanations will be omitted. To facilitate understanding, the scale of the figures will sometimes be changed.

[0011] FIG. 1 is a schematic view of the configuration of a drink supply system including the dispensing head according to the present embodiment. Referring to FIG. 1, a drink supply system 100 comprises a washing apparatus 10, drink container 20, drink server 30, washing solution supply source 40, and gas supply source 50. The drink container 20 has a spear valve 60. A dispensing head 70 is attached to the spear valve 60 (particulars explained later).

[0012] The washing apparatus 10 is used for washing a drink passage from the dispensing head 70 to the drink server 30. The washing apparatus 10, for example, has a drink supply mode for supplying a drink and a washing mode for washing the drink passage. The washing apparatus 10 has a housing 1. Inside the housing 1, a washing solution inlet 11, gas inlet 12, washing solution outlet 13, and gas outlet 14 are provided. The washing solution inlet 11 and gas inlet 12 are respectively connected through pipes P1 and P2 to the washing solution supply source 40 and gas supply source 50. The washing solution outlet 13 and gas outlet 14 are respectively connected through pipes P3 and P4 to the first fluid inlet 71 and the second fluid inlet 72 of the dispensing head 70. The washing solution inlet 11, gas inlet 12, washing solution outlet 13, and gas outlet 14 may also be provided with couplings for connecting with the pipes P1 to P4.

[0013] The washing apparatus 10 further has a display part 3 and a button 4. The display part 3 may, for example, be a liquid crystal display. The display part 3 can, for example, show various information received from a not shown processor (for example, errors, washing time, and/or selected modes etc.) The button 4 can, for example, be a mechanical type button. The button 4, for example, can be used to start the washing mode. The washing apparatus 10, for example, may further have a not shown processor, memory, real time clock, or other component element. For example, the processor, which may be a CPU (central processing unit) or MPU (microprocessor unit), may be electrically connected to the display part 3 and button 4 and the valve V and sensor SE shown

below (see FIG. 2). It may communicate with component elements in one direction or both directions. The operations performed at the processor may be realized by programs stored in, for example, the memory.

[0014] FIG. 2 is a schematic view of the configuration of a drink supply system showing the internal configuration of a washing apparatus. Referring to FIG. 2, a washing apparatus 10 has a first passage 15 and a second passage 16 inside of a housing 1. The first passage 15 connects the washing solution inlet 11 and washing solution outlet 13. The second passage 16 connects the gas inlet 12 and gas outlet 14.

[0015] The first passage 15 and the second passage 16 can, for example, be formed by pipes of various materials able to withstand the pressure of the gas and washing solution (for example, polyethylene (PE), polyvinylidene fluoride (PVDF), ethylene tetrafluoroethylene copolymer (ETFE), and polytetrafluoroethylene (PTFE)).

[0016] The first passage 15 is provided with a check valve CV.

[0017] The second passage 16 is provided with a valve V and a sensor SE. The valve V, for example, can be a pilot type solenoid valve. The valve V, for example, can be normally open (NO). The sensor SE can be used for detecting the flow of gas. For example, it may be a pressure difference meter or a flow sensor. For example, the sensor SE can measure the time of flow of gas in the gas substitution process in the piping after completion of washing and have the function of confirming whether the inside of the piping has finished being replaced in gas.

[0018] Referring to FIG. 1, the drink container 20, for example, can be a beer keg. The drink container 20 can store various drinks (for example, beer, alcoholic carbonated drinks other than beer (for example, low malt beer, beer flavored alcoholic drinks made from materials other than malt and in which other alcoholic drinks are mixed (so-called "third sector beer"), spirits with soda, or whiskey with soda), or nonalcoholic carbonated drinks (nonalcohol beer or carbonated juice) etc.)

[0019] The drink server 30 can, for example, have a stopcock type valve (below, also able to be referred to as a "stopcock valve") 31. Below the discharge outlet 32 of the stopcock valve 31, a glass or other container (not shown) is disposed at the time of supplying a drink. At the time of washing and at the time of replacing a drink container 20, a bucket or other relatively large container B is disposed. The drink server 30 has a cooling water tank 33. The cooling water tank 33 holds a coil shaped pipe 34 connected to the stopcock valve 31. The cooling water tank 33 is cooled by a cooling apparatus 35. By such a configuration, drink passing through the coil-shaped pipe 34 is cooled. At the coil shaped pipe 34, a pipe P5 connected to a fluid outlet 73 of the dispensing head 70 is connected.

[0020] The washing solution supply source 40 supplies the washing solution for washing the drink passage. The washing solution, for example, can be water. In this case, the washing solution supply source 40 can, for example, be a water faucet. If the washing solution supply source 40 is a water faucet, the pipe P1 connected to the washing solution supply source 40 may be provided with a reducing valve. The gas supply source 50 can, for example, be a gas tank. The gas supply source 50 can, for example, supply carbon dioxide gas, nitrogen gas, pressurized air, or other gas.

[0021] Next, the spear valve 60 and dispensing head 70 will be explained in detail. FIG. 3, FIG. 4, and FIG. 5 respectively are schematic views of the configuration of a dispensing head in the first, second, and third connection states.

[0022] Referring to FIG. 3, the spear valve 60 is configured to be attached to a not shown opening of a drink container 20 (not shown in FIG. 3 to FIG. 5). The spear valve 60 has a valve case 61, a gas-use valve 62, and a drink-use valve 63.

[0023] The valve case 61 has a substantially cylindrical shape and holds a gas-use valve 62 and drink-use valve 63. The valve case 61 includes an opening 61a to which a case 75 of the dispensing head 70 is fastened. At the outer circumferential surface 61b of the valve case 61, a not shown male screw is formed. This male screw engages with a female screw formed at an opening of the drink container 20. Using this, the spear valve 60 is attached to the body of the drink container 20.

[0024] The gas-use valve 62 is used for opening and closing a gas passage. The gas-use valve 62 has a substantially cylindrical shape. The clearance between the outer circumferential surface 62a of the gas-use valve 62 and the inner circumferential surface 61c of the valve case 61 defines part of the gas passage GP. The gas passage GP continues from the inside of the dispensing head 70 to the inside of the drink container 20 (in FIG. 3, below the spear valve 60). The gas-use valve 62 has an outward facing flange 62b for engaging with a lower side edge part of the opening 61a of the valve case 61. At the flange 62b, a seal means S1 is attached. The seal means S1 contacts the lower side edge part of the opening 61a. The flange 62b is biased by the spring SP1 toward the opening 61a. Due to this, the gas-use valve 62 is configured to open and close the gas passage GP. The gas-use valve 62 has an inward facing flange 62d at the inside of the flange 62b. The flange 62d has a ring shape and has a through hole. At the flange 62d, a seal means S2 is attached.

[0025] The drink-use valve 63 is used for opening and closing the drink passage. The drink-use valve 63 has a substantially cylindrical shape. The clearance between the outer circumferential surface 63a of the drink-use valve 63 and the inner circumferential surface 62c of the gas-use valve 62 defines part of the drink passage DP. The drink passage DP continues from the inside of the drink container 20 to the inside of the dispensing head 70. The drink-use valve 63 has an outward facing flange 63b for engaging with the inward facing flange 62d of the gas-use valve 62. The seal means S2 attached to the flange 62d contacts the flange 63b of the drink-use valve

63. The flange 63b is biased by the spring SP2 toward the flange 62d. Due to this, the drink-use valve 63 is configured to open and close the drink passage DP. The seal means S1 and S2, for example, can be O-rings or other plastic or metal ring-shaped gaskets or packings.

[0026] The dispensing head 70 has the case 75 and the plunger 76. Further, referring to FIG. 1, the dispensing head 70 has an operating lever 74.

[0027] Referring to FIG. 3, the case 75 is fixed to the spear valve 60. Specifically, the case 75 has a substantially cylindrical shape and has an outward facing flange 75a at its bottom end part. The flange 75a engages with a groove provided at the opening 61a of the valve case 61. At the flange 75a, a seal means S3 is attached for sealing the clearance between the case 75 and the valve case 61. The seal means S3, for example, can be an O-ring or other plastic or metal ring-shaped gasket or packing.

[0028] At the inside circumferential surface of the case 75, a first through hole 77 is defined. The first through hole 77 is fluidly communicated with the inside of the spear valve 60. At the clearance of the case 75 and the plunger 76, a fluid passage is formed.

[0029] The case 75 has a first fluid inlet 71 and a second fluid inlet 72. The first fluid inlet 71 and the second fluid inlet 72 are fluidly communicated with the first through hole 77. The second fluid inlet 72 is provided closer to the first fluid inlet 71 than the spear valve 60. The first fluid inlet 71 is supplied with the washing solution through the pipe P3 (not shown in FIG. 3) while the second fluid inlet 72 is supplied with the gas though the pipe P4 (not shown in FIG. 3).

[0030] The case 75 has seal means S4 to S6 inside the first through hole 77. The seal means S4 to S6 are configured to slidingly contact the outer circumferential surface of the plunger 76. The case 75 has the seal means S4, first fluid inlet 71, seal means S5, second fluid inlet 72, and seal means S6 in that order along the direction of flow of the fluid (washing solution and/or gas) inside of the first through hole 77 (inside clearance between the case 75 and the plunger 76).

[0031] Specifically, the seal means S4 is arranged closer to the first fluid inlet 71 than the end part of the case 75 (top end part) at the opposite side to the spear valve 60. The seal means S4 is arranged so as to constantly slidingly contact the outer circumferential surface of the plunger 76. Due to the seal means S4, at the end part at the opposite side from the spear valve 60, leakage of fluid from the clearance between the case 75 and the plunger 76 is prevented. Due to this, the flow of fluid inside the first through hole 77 heads toward the spear valve.

[0032] The seal means (first seal means) S5 is arranged between the first fluid inlet 71 and the second fluid inlet 72. The seal means (second seal means) S6 is provided closer to the second fluid inlet 72 than the spear valve 60. The above seal means S4 to S6, for example, can be O-rings or other plastic or metal ring-shaped gaskets or packings.

[0033] The plunger 76 has a substantially cylindrical shape smaller than the case 75 and is inserted inside of the case 75. The plunger 76 is configured so as to slide inside of the first through hole 77 of the case 75. Referring to FIG. 2, by switching the operating lever 74 among three positions (for example, the "up" position, "middle" position, and "down" position, the plunger 76 can slide inside of the first through hole 77 among the corresponding three positions (first, second, and third positions). Due to this, the dispensing head 70 has three connection states (first, second, and third connection states) (details explained later). Referring to FIG. 3, at the inside circumferential surface of the plunger 76, a second through hole 78 is defined. The second through hole 78 fluidly communicates with the inside of the spear valve 60. Inside of the second through hole 78, a backflow prevention mechanism 78a is provided for preventing flow of fluid in the direction from the fluid outlet 73 toward the spear valve 60. The backflow prevention mechanism 78a, for example, can include a ball, a step part formed inside the second through hole 78 and configured to be contacted by the ball from the fluid outlet 73 side, and a projection preventing detachment of the ball from the fluid outlet 73.

[0034] The plunger 76 has a first groove 76a and a second groove 76b at its outer circumferential surface. The first groove 76a and the second groove 76b, for example, have ring shapes centered about an axis of the plunger 76 and have predetermined lengths along the axis of the plunger 76.

[0035] Specifically, as shown in FIG. 4, the first groove 76a is positioned and sized so as to form a clearance between the outer circumferential surface of the plunger 76 and the seal means S5 in the second connection state.

[0036] As shown in FIG. 4 and FIG. 5, the second groove 76b is positioned and sized so as to form a clearance between the outer circumferential surface of the plunger 76 and the seal means S6 in the second connection state and the third connection state. The second groove 76b is longer than the first groove 76a in the axial direction of the plunger 76. Due to this, it is possible to form a clearance between the outer circumferential surface of the plunger 76 and the seal means S6 in the third connection state as well in addition to the second connection state.

[0037] Referring to FIG. 5, the plunger 76 has a first engaging part 76c and a second engaging part 76d. The first engaging part 76c includes a seal member S7 attached to a ring-shaped step formed at the outer circumferential surface of the plunger 76. The seal member S7 is configured as to contact the inwardly facing flange 62d of the gas-use valve 62. The seal member S7, for example, can be a plastic or metal ring-shaped gasket or packing.

[0038] The second engaging part 76d includes an end part of the plunger 76 at the spear valve 60 side. The second engaging part 76d is configured to pass through the inside of the through hole of the flange 62d of the

gas-use valve 62 and contact the end face of the drink-use valve 63. At the end part of the plunger 76 on the spear valve 60 side, a notch 76e is provided for a drink to pass through when the second engaging part 76d and the drink-use valve 63 engage. The end part of the plunger 76 on the opposite side to the spear valve 60 includes the fluid outlet 73 of the dispensing head 70.

[0039] Referring to FIG. 1, the operating lever 74, for example, can be attached to the case 75 to be able to rotate about a first pin and can be attached to the plunger 76 to be able to rotate about a second pin. By making the operating lever 74 turn about the first pin, the plunger 76 can be made to slide with respect to the case 75.

[0040] Next, the first, the second, and the third connection states will be explained in detail.

[0041] When the operating lever 74 is at the "up" position, as shown in FIG. 3, the plunger 76 is arranged at a first position the furthest from the spear valve 60 and the dispensing head 70 is in the first connection state. In the first connection state, the first engaging part 76c and the second engaging part 76d of the plunger 76 are respectively not engaged with the gas-use valve 62 and drink-use valve 63. Therefore, the gas passage GP is cut off by the seal means S1 while the drink passage DP is cut off by the seal means S2.

[0042] Further, in the first connection state, both of the seal means S5 and seal means S6 slidingly contact the outer circumferential surface of the plunger 76. Therefore, the flow from the first fluid inlet 71 is cut off by the seal means S5 and cannot advance to the downstream side of the seal means S5. Further, the flow from the second fluid inlet 72 is cut off by the seal means S6 and cannot advance to the downstream side of the seal means S6. Accordingly, in the first connection state, both of the first fluid inlet 71 and the second fluid inlet 72 are cut off from the inside of the drink container 20 and the second through hole 78 of the plunger 76 (that is, the fluid outlet 73). The "up" position, for example, can be used when replacing a drink container 20 with a new drink container.

[0043] When the operating lever 74 is at the "middle" position, as shown in FIG. 4, the plunger 76 is arranged at a second position and the dispensing head 70 is in the second connection state. At the second position, the plunger 76 is arranged between a first position farthest from the spear valve 60 (FIG. 3) and a third position closest to the spear valve 60 (FIG. 5). In the second connection state, the second engaging part 76d of the plunger 76 enters inside of the through hole of the inward facing flange 62d of the gas-use valve 62, but the first engaging part 76c and the second engaging part 76d do not respectively engage with the gas-use valve 62 and drink-use valve 63 after the first connection state. Therefore, the gas passage GP is cut off by the seal means S1 and the drink passage DP is cut off by the seal means S2.

[0044] Further, in the second connection state, the first groove 76a is arranged at the same position as the seal means S5 in the axial direction of the plunger 76. Due to this, a clearance is formed between the seal means S5 and the first groove 76a. Therefore, the flow from the first fluid inlet 71 can pass through the clearance and advance to the downstream side of the seal means S5. Further, the second groove 76b is arranged at a position including the seal means S6 in the axial direction of the plunger 76. Due to this, a clearance is formed between the seal means S6 and the second groove 76b. Therefore, the flow from the first fluid inlet 71 and the flow from the second fluid inlet 72 can pass through the clearance and advance to the downstream side of the seal means S6. In this state, since, as explained above, the gas passage GP and drink passage DP are cut off, the flow from the inside of the first through hole 77 (inside clearance between the case 75 and the plunger 76) passes through the clearance between the second engaging part 76d of the plunger 76 and the inward facing flange 62d of the gas-use valve 62, flows to the inside of the second through hole 78 of the plunger 76, and further flows from the fluid outlet 73 to the outside of the dispensing head 70. Therefore, in the second connection state, both of the first fluid inlet 71 and the second fluid inlet 72 fluidly communicate with the second through hole 78 of the plunger 76 and are cut off from the inside of the drink container 20. The "middle" position can be used when the washing mode is performed.

[0045] If the operating lever 74 is at the "down" position, as shown in FIG. 5, the plunger 76 is arranged at the third position closest to the spear valve 60, and the dispensing head 70 is at the third connection state. In the third connection state, the first engaging part 76c and the second engaging part 76d of the plunger 76 respectively contact the gas-use valve 62 and drink-use valve 63 and respectively push open the gas-use valve 62 and drink-use valve 63 against the spring SP1 and the spring SP2. Therefore, the gas passage GP and drink passage DP are opened. Further, since the seal member S7 of the first engaging part 76c contacts the inward facing flange 62d of the gas-use valve 62, direct communication between the first through hole 77 and the second through hole 78 is prevented.

[0046] Further, in the third connection state, the seal means S5 slidingly contacts the outer circumferential surface of the plunger. Therefore, the flow from the first fluid inlet 71 is cut off by the seal means S5 and cannot advance to the downstream side of the seal means S5. On the other hand, the second groove 76b is arranged at a position including the seal means S6 in the axial direction of the plunger 76. Due to this, a clearance is formed between the seal means S6 and the second groove 76b. Therefore, the flow from the second fluid inlet 72 can pass through the clearance and advance to the downstream side of the seal means S6. In this state, since as explained above the gas passage GP and drink passage DP are opened and direct communication between the first through hole 77 and the second through hole 78 is prevented, the flow from the second fluid inlet 72 (flow of gas) passes through the gas passage GP and flows

to the inside of the drink container 20. Due to the pressure of the gas, the drink inside of the drink container 20 passes through the drink passage DP, flows from the notch 76e to the inside of the second through hole 78, and further flows from the fluid outlet 73 to the outside of the dispensing head 70. Therefore, in the third connection state, the first fluid inlet 71 is cut off from the inside of the drink container 20 and the second through hole 78 of the plunger 76, while the second fluid inlet 72 fluidly communicates with the second through hole 78 of the plunger 76 through the inside of the drink container 20. The "down" position is used when the drink supply mode is performed.

[0047] Next, the operation of the drink supply system 100 will be explained.

[0048] Referring to FIG. 2, in the drink supply mode, the operating lever 74 of the dispensing head 70 is set at the "down" position. Due to this, as shown in FIG. 5, only the second fluid inlet 72 of the dispensing head 70 is connected through the inside of the drink container 20 to the fluid outlet 73. Therefore, for example, even when the operator is keeping a stopcock of the washing solution supply source 40 open, the washing solution will not be supplied to the inside of the drink container 20. In the drink supply mode, a glass or other container is placed below the discharge outlet 32 of the drink server 30.

[0049] The washing apparatus 10, for example, can maintain the drink supply mode until the button 4 is pushed. Referring to FIG. 2, in the present embodiment, the valve V is normally open, so in the drink supply mode, the valve V is open. Therefore, in the drink supply mode, gas is supplied from the gas outlet 14. The gas is supplied from the gas outlet 14 through the second fluid inlet 72 of the dispensing head 70 to the inside of the drink container 20 and pushes the drink at the inside of the drink container 20 out to the fluid outlet 73 of the dispensing head 70. The drink is supplied from the fluid outlet 73 to the drink server 30. If the operator opens the stopcock valve 31, drink is supplied from the discharge outlet 32.

[0050] If performing the washing mode, before starting the washing mode, a bucket or other container B is placed below the discharge outlet 32 of the drink server 30.

[0051] The washing apparatus 10 can start the washing mode if, for example, the button 4 is pushed. If the washing mode is started, the washing apparatus 10 closes the valve V. If the operator sets the operating lever 74 of the dispensing head 70 to the "middle" position, as shown in FIG. 4, both of the first fluid inlet 71 and the second fluid inlet 72 of the dispensing head 70 are connected to the fluid outlet 73 without passing through the inside of the drink container 20. However, the valve V is closed, so the gas is not supplied from the second fluid inlet 72. Referring to FIG. 2, if the operator opens the stopcock of the washing solution supply source 40 or if the operator maintains the stopcock of the washing solution supply source 40 as opened, the washing solution flows from the first fluid inlet 71 to the fluid outlet 73 without passing through the inside of the drink container 20 and further flows to the drink server 30. If the operator opens the stopcock valve 31, the washing solution is discharged from the discharge outlet 32.

[0052] The time period during which the washing solution is supplied can be adjusted in accordance with, for example, the type of the drink, the length and/or the diameter of the passage, etc. For example, it may be 1 to 3 minutes or so. Note that the numerical value is just a simple illustration. The washing solution may be continuously supplied (below, able to be referred to as "continuous washing") or may be intermittently supplied (below, able to be referred to as "intermittent washing"). For intermittent washing, the washing apparatus 10 can alternately repeat a first state in which the valve V is closed and a second state where the valve V is open. In intermittent washing, compared with continuous washing, the washing solution flows through the passage by a higher pressure. Therefore, the washing ability can be improved. For example, if the washing solution is supplied for a predetermined time, the washing apparatus 10 may indicate this by showing it on the display part 3 and/or by voice from a not shown speaker.

[0053] After the washing solution is supplied, the operator, for example, may close the stopcock of the washing solution supply source 40 and open the valve V to supply the gas from the second fluid inlet 72. Due to the gas, it is possible to eject the washing solution remaining in the passage from the dispensing head 70 to the drink server 30. For example, the valve V may also be opened by again pushing the button 4 or pushing a not shown additional button. If all of the washing solution remaining in the passage is pushed out from the discharge outlet 32, the gas is supplied from the discharge outlet 32.

[0054] The time period during which the gas is supplied, for example, can be made equal to or greater than the time period taken for the washing solution remaining in the passage from the dispensing head 70 to the drink server 30 to be pushed out and can change according to the length and/or diameter etc. of the passage. If this time period elapses, the washing apparatus 10 may notify the end of the washing mode. The notification may, for example, be given on the display part 3 and/or may be given by voice from a not shown speaker. After the washing mode ends, the stopcock valve 31 is closed and the operating lever of the dispensing head 70 is set to the "down" position. Due to this, the drink supply system 100 is made ready to supply drink again.

[0055] If exchanging an empty drink container 20 with a new drink container 20, the operator places a bucket or other container B below the discharge outlet 32. If the operator opens the stopcock valve 31, the drink and later gas remaining in the passage from the dispensing head 70 to the drink server 30 are received by the container B. After all of the drink is discharged from the discharge outlet 32, the operator closes the stopcock valve 31 and sets the operating lever 74 of the dispensing head 70 to the "up" position. Due to this, as shown in FIG. 3, both of the first fluid inlet 71 and the second fluid inlet 72 are

cut off from the inside of the drink container 20 and the fluid outlet 73. After that, the operator detaches the dispensing head 70 from the empty drink container 20 and attaches the dispensing head 70 to a new drink container 20. Due to this, the exchange of drink containers 20 is completed. If the operating lever 74 is set to the "down" position, the drink supply system 100 is made ready to supply the drink.

[0056] Above, according to a dispensing head 70 according to the embodiment, the case 75 has two fluid inlets (first fluid inlet 71 and second fluid inlet 72). Further, the dispensing head 70 has three connection states (first, second, and third connection states). In the dispensing head 70, the first fluid inlet 71 is cut off from both of the inside of the drink container 20 and the second through hole 78 of the plunger 76 (that is, the fluid outlet 73) in the first connection state and the third connection state in the three connection states. Further, the first fluid inlet 71 is fluidly communicated with the second through hole 78 of the plunger 76 in the second connection state as well, but is cut off from the inside of the drink container 20. That is, the first fluid inlet 71 is cut off from the inside of the drink container 20 in all of the three connection states. Therefore, by running the washing solution from the first fluid inlet 71 and the gas from the second fluid inlet 72, the flow of the washing solution to the inside of the drink container 20 is mechanically prevented. Therefore, it is possible to reliably prevent the washing solution from being mistakenly supplied to the inside of the drink container 20.

[0057] Further, as explained above, the first fluid inlet 71 is cut off from both of the inside of the drink container 20 and the fluid outlet 73 in the first connection state and the third connection state, so when not at the time of washing, even if the stopcock of the washing solution supply source 40 is opened, the flow of the washing solution can be stopped.

[0058] Further, the second groove 76b is longer than the first groove 76a in the axial direction of the plunger 76. Therefore, using a simple configuration, it is possible to form a clearance between the outer circumferential surface of the plunger 76 and the seal means S6 in both of the second connection state and the third connection state.

[0059] Embodiments of a dispensing head were explained, but the present invention is not limited to the above embodiments. A person skilled in the art would understand that various modifications of the above embodiments are possible. Further, a person skilled in the art would understand that the features included in one embodiment can be incorporated into other embodiments or the features included in other embodiments can be switched with so long as no contradiction arises.

[0060] For example, in the above embodiments, the dispensing head 70 was connected through the washing apparatus 10 to the washing solution supply source 40 and gas supply source 50. However, in another embodiment, the washing solution supply source 40 may be connected with the first fluid inlet 71 of the dispensing head 70 directly through the pipe P1 without going through the washing apparatus 10 while the gas supply source 50 may be connected with the second fluid inlet 72 of the dispensing head 70 directly through the pipe P2 without going through the washing apparatus 10. In this case, for example, the operator can switch between supply of a drink and washing of a passage by manually operating not shown stopcocks provided at the washing solution supply source 40 and gas supply source 50.

REFERENCE SIGNS LIST

[0061]

20 drink container
60 spear valve
62 gas-use valve
63 drink-use valve
70 dispensing head
71 first fluid inlet
72 second fluid inlet
75 case
76 plunger
76a first groove
76b second groove
76c first engaging part
76d second engaging part
77 first through hole
78 second through hole
S5 seal means (first seal means)
S6 seal means (second seal means)

Claims

1. A dispensing head attached to a spear valve of a drink container, the dispensing head comprising:

a case to be fixed to the spear valve, which case has a first through hole fluidly communicating with an inside of the spear valve, and
a plunger sliding inside the first through hole of the case, which plunger has a second through hole fluidly communicating with an inside of the spear valve,
the case comprising
a first fluid inlet fluidly communicating with the first through hole,
a first seal means arranged in the first through hole at a downstream side from the first fluid inlet and slidingly contacting the outer circumferential surface of the plunger,
a second fluid inlet fluidly communicating with the first through hole at a downstream side from the first seal means, and
a second seal means arranged in the first through hole at a downstream side from the sec-

ond fluid inlet and slidingly contacting the outer circumferential surface of the plunger,
the plunger comprising
a first groove for forming a clearance between the outer circumferential surface of the plunger and the first seal means,
a second groove for forming a clearance between the outer circumferential surface of the plunger and the second seal means,
a first engaging part configured to engage with a gas-use valve of the spear valve, and
a second engaging part configured to engage with a drink-use valve of the spear valve,
the dispensing head having a first connection state, a second connection state, and a third connection state,
in the first connection state,
the first engaging part and the second engaging part of the plunger respectively not engaging with the gas-use valve and the drink-use valve of the spear valve, and
the first seal means and the second seal means both slidingly contacting the outer circumferential surface of the plunger,
whereby the first fluid inlet and the second fluid inlet both are cut off from the inside of the drink container and the second through hole of the plunger,
in the second connection state,
the first engaging part and the second engaging part of the plunger respectively not engaging with the gas-use valve and the drink-use valve of the spear valve, and
clearances being formed between the first seal means and the first groove, and between the second seal means and the second groove,
whereby both the first fluid inlet and the second fluid inlet fluidly communicate with the second through hole of the plunger and are cut off from the inside of the drink container,
in the third connection state,
the first engaging part and the second engaging part of the plunger respectively pushing open the above gas-use valve and the above drink-use valve of the spear valve, and
the first seal means slidingly contacts the outer circumferential surface of the plunger and a clearance is formed between the second seal means and the second groove,
whereby the first fluid inlet is cut off from the inside of the drink container and the second through hole of the plunger while the second fluid inlet fluidly communicates through the inside of the drink container with the second through hole of the plunger.

2. The dispensing head according to claim 1, wherein the case further comprises a third seal means arranged closer to the first fluid inlet than the end part of the case at the opposite side to the spear valve, and
the third seal means constantly slidingly contacts the outer circumferential surface of the plunger.

FIG. 1

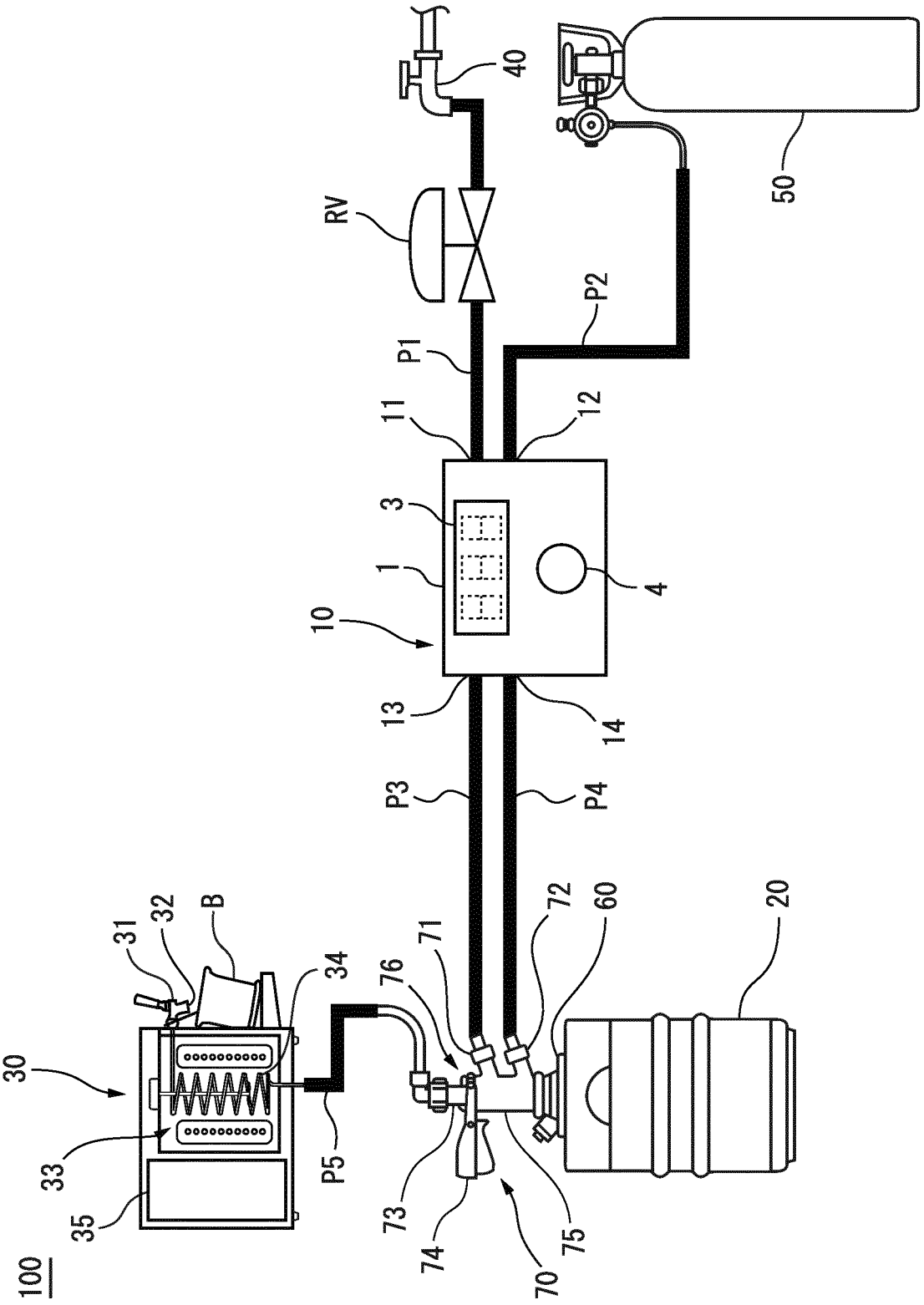
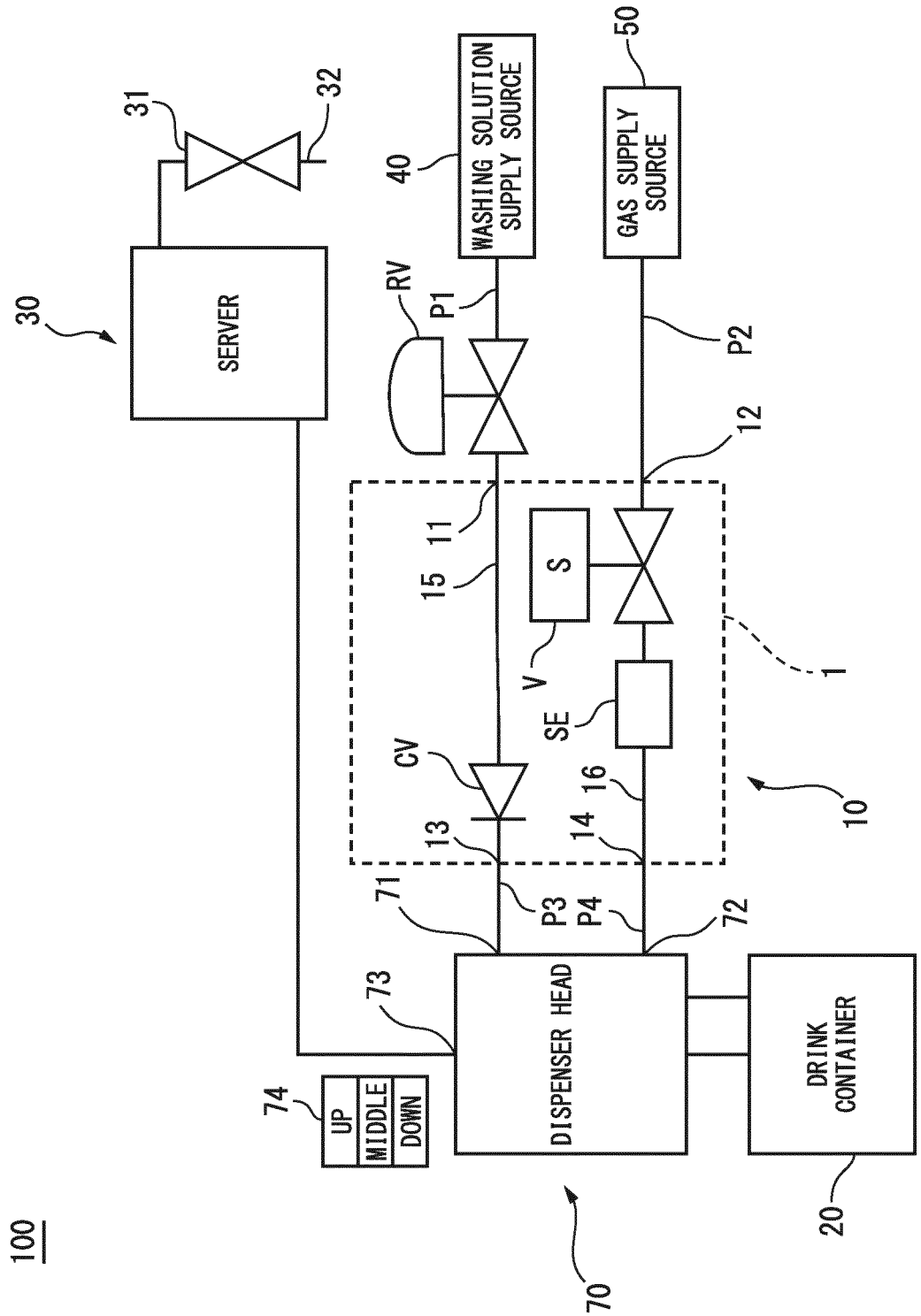

40
50
RV
P2
P1
11
12
3
1
4
10
13
14
P3
P4
31
32
B
34
76
71
72
60
20
30
33
35
P5
73
74
70
75
100

FIG. 2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SERVER
31
32
40
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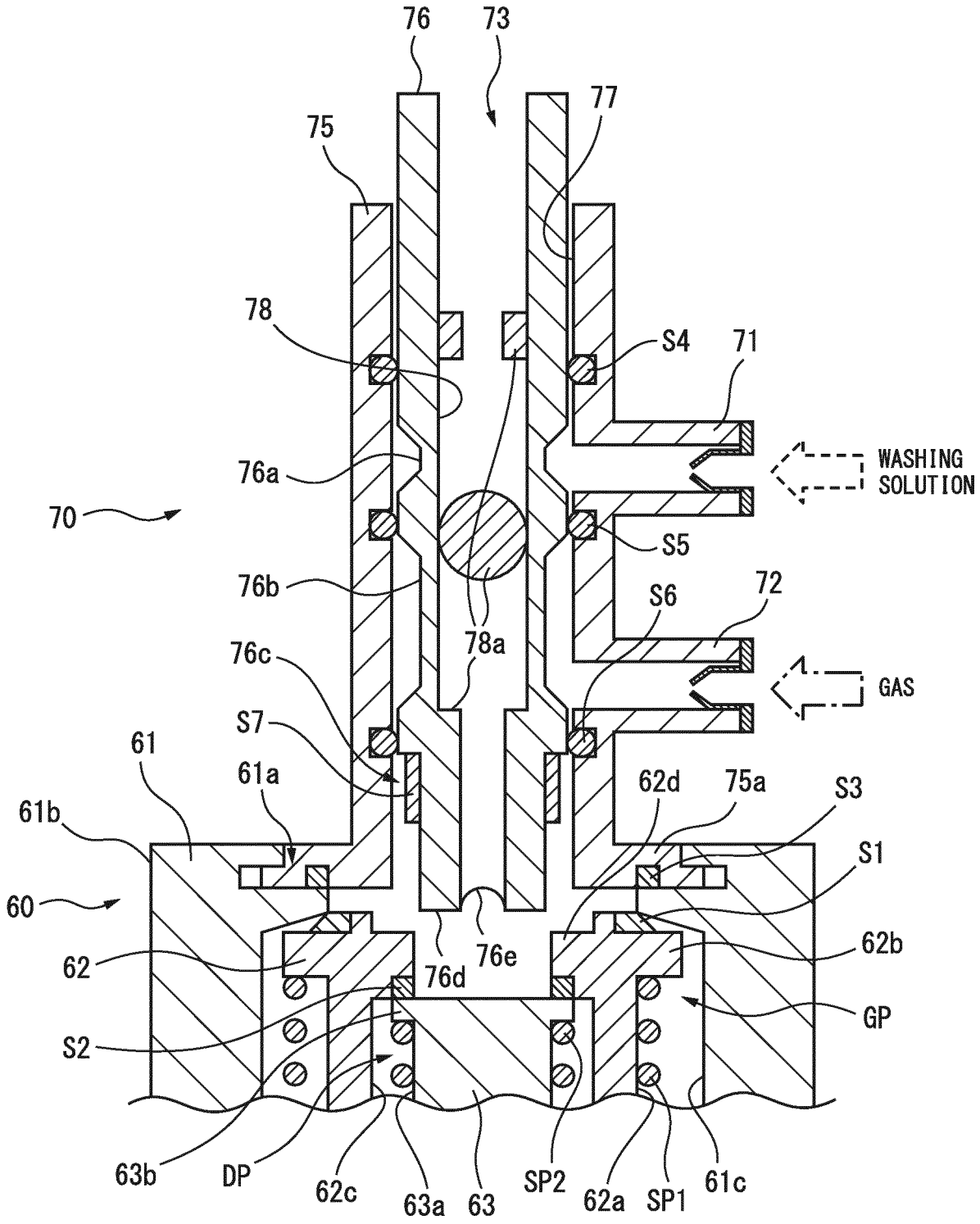
50
GAS SUPPLY SOURCE
RV
P1
P2
12
11
15
S
V
SE
1
CV
16
10
13
14
71
P3
P4
72
73
DISPENSER HEAD
DRINK CONTAINER
20
74
UP
MIDDLE
DOWN
70

FIG. 3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73
77
75
78
S4
71
WASHING SOLUTION
76a
70
S5
76b
S6
72
78a
76c
GAS
S7
61
61a
62d
75a
S3
61b
S1
60
62b
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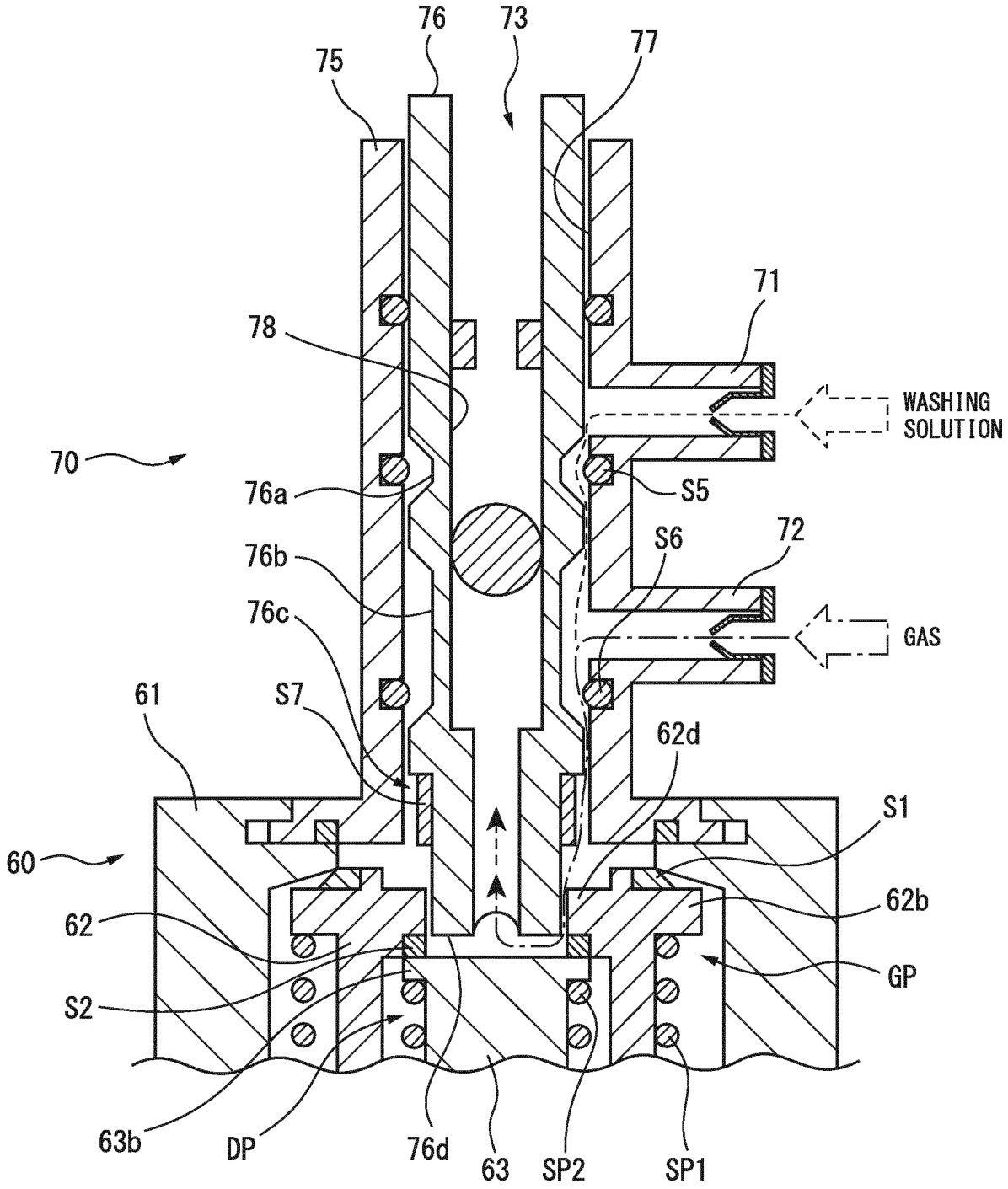
S2
63b
DP
62c
63a
63
SP2
62a
SP1
61c

FIG. 4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WASHING SOLUTION
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76a
S5
S6
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76b
76c
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S7
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S1
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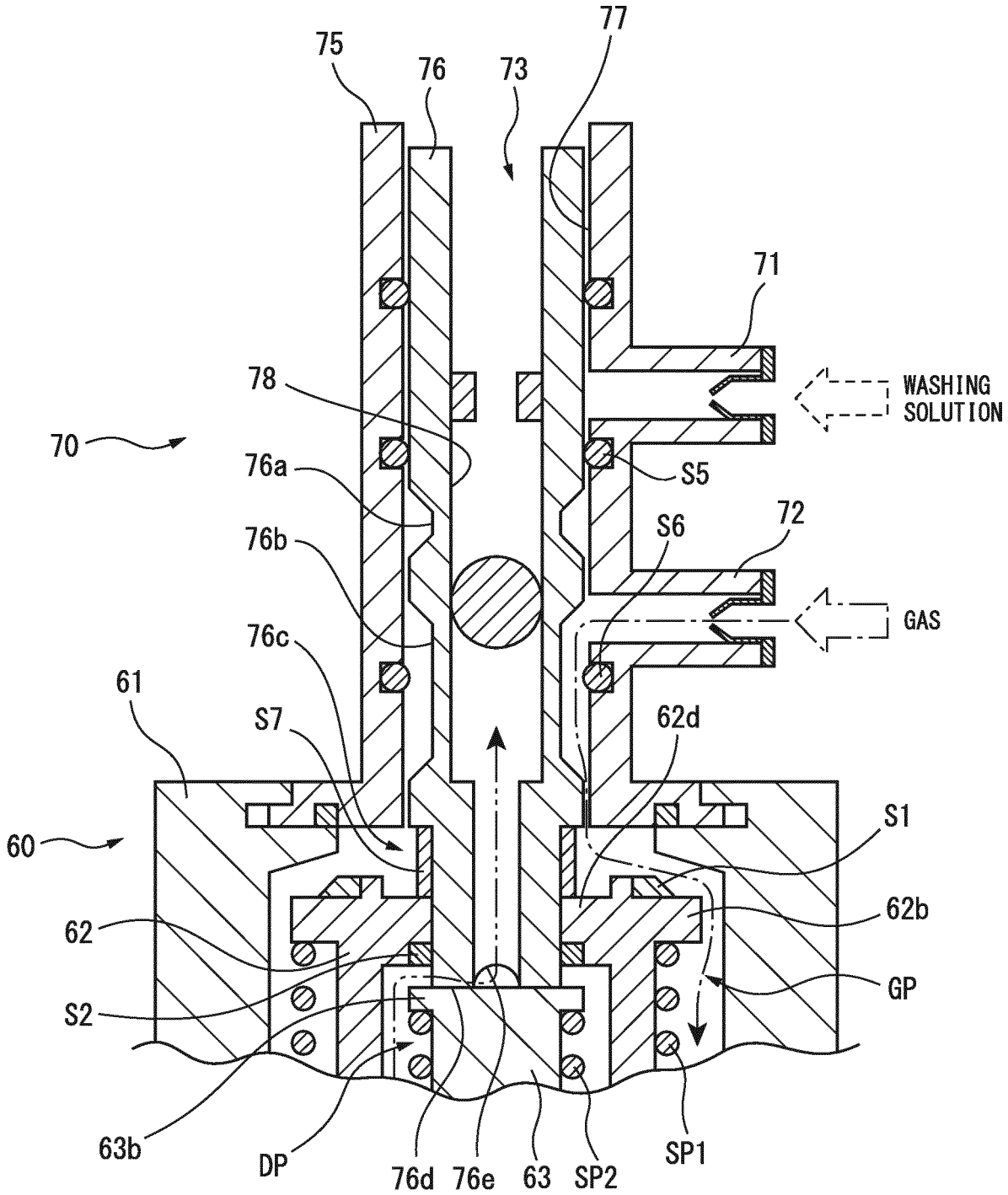
62b
62
GP
S2
63b
DP
76d
63
SP2
SP1

FIG. 5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76b
76c
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S7
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76d
76e
63
SP2
SP1
S5
S6
72
62d
S1
62b
GP
WASHING SOLUTION
GAS

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/050674

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. B67D1/07(2006.01)i, B67D1/04(2006.01)i
FI: B67D1/07, B67D1/04F

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl. B67D1/07, B67D1/04, B67D1/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2020
Registered utility model specifications of Japan	1996-2020
Published registered utility model applications of Japan	1994-2020

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2018/212349 A1 (SUNTORY HOLDINGS LTD.) 22.11.2018 (2018-11-22), paragraphs [0022]-[0027], [0037], [0038], fig. 3A-3C	1-2
A	JP 2006-264716 A (FIC KK) 05.10.2006 (2006-10-05), paragraphs [0019]-[0022], fig. 1, 2	1-2

☐ Further documents are listed in the continuation of Box C.
☒ See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search 03.03.2020	Date of mailing of the international search report 17.03.2020
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2019/050674

WO 2018/212349 A1	22.11.2018	TW 201900542 A	
JP 2006-264716 A	05.10.2006	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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