(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 574 744 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.06.2025 Bulletin 2025/26

(21) Application number: **23218095.0**

(22) Date of filing: **19.12.2023**

(51) International Patent Classification (IPC):
B67D 1/04 *(2006.01)* ***B67D 1/07*** *(2006.01)*
B67D 1/08 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B67D 1/0462; B67D 1/07; B67D 1/0888;
B67D 2210/0006

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

(71) Applicant: **Grever Sørensen Holding ApS**
5700 Svendborg (DK)

(72) Inventor: **Sørensen, Jan**
5700 Svendborg (DK)

(74) Representative: **Plougmann Vingtoft a/s**
Strandvejen 70
2900 Hellerup (DK)

(54) **A DEVICE AND METHOD FOR DISPENSING BEER AND CLEANING IN PLACE**

(57) A device (1) for a beer dispensing system, the device comprising a common chamber (2) having an air port (3), a cleaning agent port (4), a vent port (5), a pressure port (6) and an actuator port (7), wherein each of said ports being associated with an electrical or pneumatic controllable shut-off valve (V3, V4, V5, V6, V7) to control a flow of fluid through the ports individually from each other.

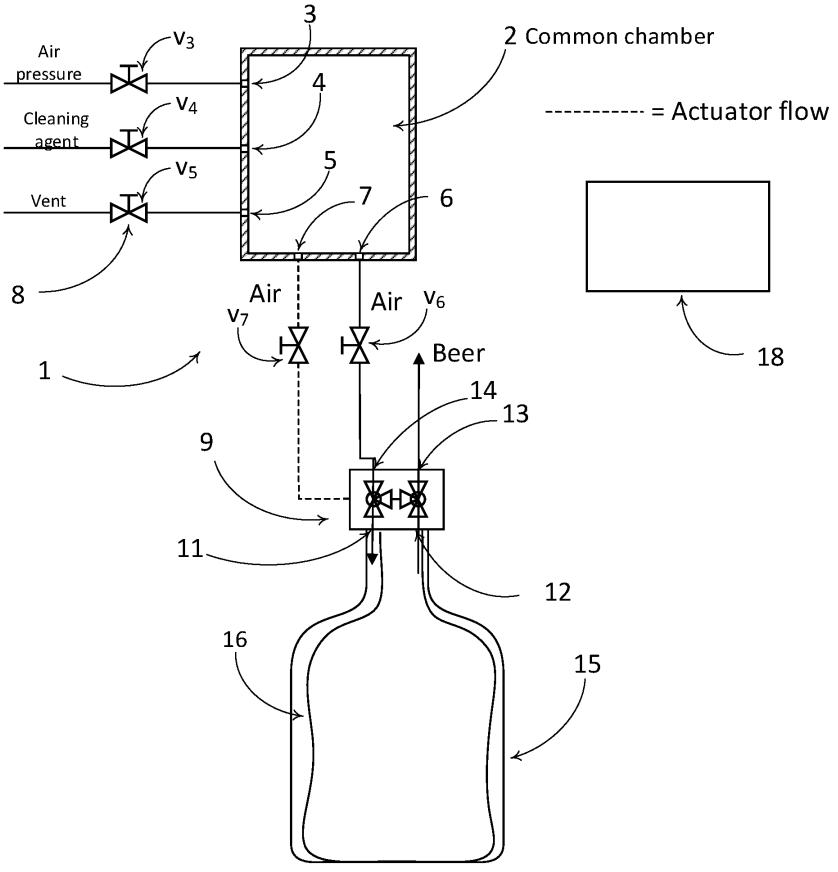


Fig. 1A

EP 4 574 744 A1

Description

[0001] The present invention relates to device for a beer dispensing system, the device comprising a common chamber having an air port, a cleaning agent port, a vent port, a pressure port and an actuator port, wherein each of said ports being associated with an electrical or pneumatic controllable shut-off valve to control a flow of fluid through the ports individually from each other.

BACKGROUND OF THE INVENTION

[0002] Beer dispensing systems for dispensing beer contained in a keg are widely used today. Although they are easy operate, cleaning of the fluid lines between a beer tap and keg coupler connected to the keg, as well as the keg coupler itself is often a difficult and labor intensive process. Such cleaning process typically involves manually handling of various couplings connecting e.g. a cleaning fluid container to the beer dispensing system.

[0003] Today, the cleaning process is often further complicated by that the keg with keg coupler quite often are located remote to the beer tap, such as located in a basement and the beer tap located in a serving area remote from the basement. As the cleaning most often must involves cleaning of the full length of the fluid line extending from the keg coupler and to the beer tap, personnel carrying out the cleaning has to "pendle" between the keg and the beer tap. For instance, today personnel must have access to the keg and keg coupler to change from a beer dispensing mode to a cleaning mode (and vice versa). Once changed into a cleaning mode, for instance, the personnel must be located at the beer tap to open the beer tap for allowing cleaning fluid to flow through the full length of the fluid. Once the cleaning has been completed, the personnel will have to return to the basement and change the system into a beer dispensing mode. Such a "pendle" forth and back is clearly disadvantageous.

[0004] Hence, an improved dispensing of beer and cleaning of a beer dispensing system would be advantageous, and in particular a more efficient and/or reliable dispensing of beer and cleaning of a beer dispensing system would be advantageous.

OBJECT OF THE INVENTION

[0005] In particular, it may be seen as an object of the present invention to provide a device for a beer dispensing system that solves the above mentioned problems of the prior art.

SUMMARY OF THE INVENTION

[0006] Thus, the above described object and several other objects are intended to be obtained in a first aspect of the invention by providing a device for a beer dispensing system, said device comprising:

- a common chamber having:
    - an air port, a cleaning agent port, a vent port, a pressure port and, preferably, an actuator port, wherein each of said ports being associated with an electrical or pneumatic controllable shut-off valve to control a flow of fluid through the ports individually from each other;
- an electronic controller being electrical connected with an actuator of each of said associated valves, said actuators being configured to open and close each of said valves individually by said controller providing an electrical control signal to said actuators;
- said electronic controller being configured for setting said associated valves in at least two chamber configurations:
    - a 1st chamber configuration in which said valves associated with said air port and said pressure port are open, and in which said valves associated with said cleaning agent port and said vent port are closed,
    - a 2nd chamber configuration in which said valves associated with said cleaning agent port and said pressure port are open, and in which said valves associated with said air port and said vent port are closed.

[0007] A port being associated with an electronic controllable shut-off valve refers to that a valve is provided for closing and opening for flow of fluid through the port.

[0008] In a second aspect, the invention relates to method of operating the device according to the first aspect, the method comprising:

- instructing said controller to set the associated valves in one of the 1st or the 2nd chamber configuration.

BRIEF DESCRIPTION OF THE FIGURES

[0009] The present invention and in particular preferred embodiments thereof will now be described in more detail with regard to the accompanying figures. The figures show ways of implementing the present invention and are not to be construed as being limiting to other possible embodiments falling within the scope of the attached claim set.

Fig. 1A schematically illustrates a first embodiment of a device for a beer dispensing system; the embodiment is illustrated in combination with a 1st valve configuration according to which beer is dispensed from a keg. Fig. 1B is a close-up of the valve mechanism;

Fig. 2A schematically illustrates the valve mechanism of Fig. 1B configured into a 1st valve configuration. Fig. 2B schematically illustrates the valve mechanism of Fig. 1B configured into a 2nd valve configuration. Fig. 2C schematically illustrates the valve mechanism of Fig. 1B configured into a 3rd valve configuration. Gray shaded objects in Fig. 2A, 2B and 2C indicates flow of fluid.

Fig. 3A and 3B are 3-dimensional representations of, among others, a common chamber with associated valves and actuators according to a preferred embodiment. Fig. 3A left hand side illustrates the common chamber with cut-aways, and Fig. 1B right hand side illustrates the interior of the common chamber. In the illustrated embodiment, all valves are closed. Fig. 3B is a close-up of Fig. 3A and the gasket 36 is left out for clarity reasons. Fig. 3C is a 3-dimensional representation of a common chamber including, inter alia a casing encasing the common chamber and a controller. The ports 3, 4 and 5 are provided in the wall member 30, and the ports 6 and 7 are provided in the housing 29.

Fig. 4A-4C the embodiment of Fig. 3 in different chamber configurations of the valves associated with ports of the common chamber. The gasket 36 is left out for clarity reasons.

Fig. 5A schematically illustrates a second embodiment of a device for a beer dispensing system; the embodiment is illustrated with a a 1st valve configuration according to which beer is dispensed from a keg. Fig. 5B is a close-up of the valve mechanism;

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0010] Reference is made to Fig. 1A schematically illustrating a first embodiment of a device 1 for a beer dispensing system. The beer dispensing system is typically a system in which beer is contained in a keg 15 where the interior of the keg 15 containing the beer is fluidically connected with a beer tap via a keg coupler 9. In the embodiment of Fig. 1A the keg 15 is of a type, where beer is contained in a beer bag 16, and pressurized air is inlet to the keg 15 to pressurize a cavity in between the beer bag 16 and the interior wall of the keg 15, which pressurization will provide a pressure which presses beer towards the beer tap.

[0011] The illustrated device comprises a common chamber 2. Such a common chamber is typically a void provided in a housing (29) of the device made from an fluid impermeable material.

[0012] The common chamber 2 has an air port 3 preferably for infeed of pressurized air or COz to the common chamber 2, a cleaning agent port 4 preferably for infeed of a cleaning agent such water with ozone to the common chamber 2, a vent port 5 preferably for outflow of air or COz from the common chamber 2, a pressure port 6 preferably for outflow of pressurized air or COz or cleaning agent from the common chamber, and an actuator port 7 preferably for supply of pressurized air to the valve mechanism 10 from the common chamber 2. The air port 3 is preferably fluidicly connected to a source of pressurized air or COz, the cleaning agent port 4 is preferably fluidicly connected to a source of cleaning agent, such as water with ozone, and the vent port 5 is preferably fluidicly connected to atmospheric pressure, such as to the surrounding atmosphere. The pressure port 6 and the actuator port 7 are fluidicly connected to fluid lines 26 and 25 respectively, which fluid lines are connected to the valve mechanism 10.

[0013] The functions of these ports 3, 4, 5, 6 and 7 will be disclosed here below. A port here refers to an opening into the common chamber 2 extending from an outside position and through which port fluid may flow into and/or out from the common chamber 2.

[0014] To control fluid flow into and/or out from the common chamber 2, each of the ports is associated with an electrical or pneumatic controllable shut-off valve v_3, v_4, v_5, v_6, v_7 to control a flow of fluid through the ports individually from each other. By "associated with" typically refers to that the flow through ports can be controlled and that a valve may be located in a distance from the port, or as will be disclosed in connection with e.g. Figs. 3A-C and Figs. 4A-C be a valve which blocks an opening of a port.

[0015] As will become apparent from the following, the valves of the device are to be open and closed, typically, independent from each other and an advantage of the invention is that such setting of the valves can be controlled by an

electronic controller. Accordingly, preferred embodiments of the device comprises an electronic controller 18 being electrically connected with an actuator 19 of each of the associated valves v_3, v_4, v_5, v_6, v_7.

[0016] In the embodiments disclosed herein, the actuators 19 are electrical actuators, but pneumatic actuators may be used instead of an electrical actuator 19. The illustrated electrical actuators each comprises an electrical motor connected via a gearing to a movable stem of an associated valve, so that when the electrical motor is powered by electrical current, the stem moves forward or backward depending on the direction of the electrical current.

[0017] When the actuators are pneumatic actuators, a electrical current is used to control a control valve which control flow into or out from the actuators. Pneumatic actuators is typically configured to move the stems of the associated valves forward or backward.

[0018] The actuators are configured to open and close each of the valves v_3, v_4, v_5, v_6, v_7 individually by the controller 18 provides an electrical control signal to the actuators.

[0019] In preferred embodiments, the device is used for at least to purposes:

- Providing pressurized air to the keg 15 for beer dispensing through the keg coupler 9. This is referred to as a 1st chamber configuration.
- Providing a cleaning agent to clean the keg coupler 9, a fluid line extending from the keg coupler and to a beer tap as well as the beer tap itself. As such cleaning typically is carried out without decoupling the keg coupler, the fluid line or the beer tap, the cleaning is herein referred to as cleaning-in-place (CIP). This is referred to as a 2nd chamber configuration.

[0020] Accordingly, the electronic controller 18 is in preferred embodiments configured for setting the associated valves in at least two chamber configurations:

- a 1st chamber configuration in which the valves v_3, v_6 associated with the air port 3 and the pressure port 6 are open, and in which the valves v_4, v_5 associated with the cleaning agent port 4 and the vent port 5 are closed,
- a 2nd chamber configuration in which the valves v_4, v_6 associated with the cleaning agent port 4 and the pressure port 6 are open, and in which the valves v_3, v_5 associated with the air port 3 and the vent port 5 are closed.

[0021] The 1st chamber configuration is illustrated in Fig. 4A and the 2nd chamber configuration is illustrated in Fig. 4 which is illustrated in Fig. 4B. Kindly observe that each of the associated valves v_3, v_4, v_5 closes a port by a movement to the left in the figures, whereas each of the associated valve v_6, v_7 opens a port by a movement to the left in the figures.

[0022] As indicated above, the device 1 for a beer dispensing is suitable for co-operating with a keg coupler 9 in a manner where the device 1, inter alia, feeds, to the keg coupler 9, pressurized air for effectuating beer dispensing or a cleaning agent to clean the to the keg coupler 9 and beer distribution lines leading to a beer tap.

[0023] With reference to Figs. 1A and B, a keg coupler 9 suitable to co-operate with the device 1 may comprise a valve mechanism 10 fluidically connected - or connectable - to the pressure port 6 and the actuator port 7.

[0024] Kindly observe, that although the valve mechanism 10 is indicated as located in the keg coupler 9, a keg coupler 9 as disclosed herein is configured to co-operate with a keg 15 which has one or more build-in keg valves which upon activation allows for introduction of air or COz into the keg to pressurize the keg and to allow beer to flow out of the keg via the keg coupler 9. Thus, the valve mechanism 10 as referred to herein refer to the combination of the keg valve(s) and valve(s) of the coupler 9.

[0025] The valve mechanism 10 may be constructed so that it is selectable configurable into two valve configurations:

- a 1st valve configuration in which said pressure port 6 is fluidically connected with an keg pressure outlet 11, and in which a beer inlet 12 is fluidically connected with a beer outlet 13 of said keg coupler 9;
- a 2nd valve configuration in which said pressure port 6 is fluidically connected with said beer outlet 13, and in which flow of fluid through said beer inlet 12 and said keg pressure outlet 11 is prevented.

[0026] Figs. 2A and B schematically illustrates a 1st and a 2nd valve configuration of the valve mechanism 10.

[0027] The 1st valve configuration is a configuration in which the keg is pressurized and a connection is available for outflow of beer from the keg, through keg coupler; thus the 1st valve configuration may also be referred to a beer dispensing valve configuration.

[0028] The 2nd configuration is a configuration in which a cleaning fluid can pass through the keg coupler and towards a beer tap. Accordingly, the 2nd configuration may also be referred to a Cleaning In Place, CIP valve configuration. In preferred embodiments, the cleaning fluid is water with ozone.

[0029] The 1st and the 2nd valve configurations are each configurable by controlling the shut-off valve v_7 associated with said actuator port 7 as will be disclosed in greater details below.

[0030] As the 1st chamber configuration typically succeeds another chamber configuration, the opening and closing of

the associated valves may advantageous be carried out in such that the controller 18 carries out the following procedure to provide the 1st chamber configuration by steps of:

- open, if closed, the valves v_3, v_6 associated with the air port 3 and the pressure port 6, whereby a fluid connection is provided between the air port and the pressure port 6,
- close, if open, the valves v_4, v_5 associated with the cleaning agent port 4 and said vent port 5, which closes for a fluid connection which could otherwise bypass the fluid connection between the air port 3 and the pressure port 6.

[0031] Similarly, as the 2nd chamber configuration typically succeeds another chamber configuration, the opening and closed of the associated valve may advantageous be carried out in such that the controller 18 carries out the following procedure to provide the 2nd chamber configuration by steps of:

- open, if closed, the valves v_4, v_6 associated with the cleaning agent port 4 and the pressure port 6, whereby a fluid connection is provided between cleaning agent port 4 and the pressure port 6,
- close, if open, the valves v_3, v_5 associated with the air port 3 and the vent port 5, which closes for a fluid connection between the air port 3 and the vent port 5 which could otherwise bypass the fluid connection between the cleaning agent port 4 and the pressure port 6.

[0032] The 1st and the 2nd chamber configuration are for respectively beer dispensing and CIP, there may also be a need for depressurise the keg 15 prior to being changed. This situation typically occurs when the keg is empty (from beer) but still being pressurized. To allow for easy decoupling of the keg coupler 9 and limit beer residue spillage, it is generally preferred to depressurize the keg prior to being decoupled from the keg coupler.

[0033] To accomplish this, the controller 18 is configured for setting the associated valves in a

- 3rd chamber configuration in which the valves v_5, v_6 associated with the vent port 5 and the pressure port 6 are open, and in which the valves v_3, v_4 associated with the air port 3 and the cleaning agent port 4 are closed. By this, a fluid connection is provided between the pressure port 6 and the vent 3 provided allowing pressurised air or gas in the keg to escape the keg through the keg coupler 9 to the vent port 5. The closing of the air port 3 and the cleaning agent port 4 assures that air or gas entering the common chamber 2 from the keg will flow out of the common chamber through the vent port 5.

[0034] As the 3rd chamber configuration typically succeeds another chamber configuration, the opening and closed of the associated valve may advantageous be carried out in such that the controller 18 carries out the following procedure to provide the 3rd chamber configuration by steps of:

- open, if closed, the valves v5, v6 associated with the vent port 5 and the pressure port 6
- close, if open, the valves v3, v4 associated with the air port 3 and the cleaning agent port 4 are closed.

[0035] In addition to the 1st and the 2nd valve configuration, the valve mechanism 10 may be selectable configurable into a 3rd configuration in which the pressure port 6 is fluidically connected with the keg pressure outlet 11, and in which flow through the beer inlet 12 is prevented. This 3rd valve configuration is illustrated in Fig. 2C and serves the purpose of depressurizing a keg via the keg coupler 9 and flow of gas (air) from the keg flow into the common chamber through pressure port 6 and out from the common chamber 2 through vent port 5. The 3rd configuration is configurable by controlling said shut-off valve v_7 associated with said actuator port 7.

[0036] The different chamber configurations are detailed in Table 1 below.

Table 1

Chamber configuration	**Fig.**	**V_3**	**V_4**	**V_5**	**V_6**	**V_7**
1st (beer dispense)	Fiq. 4A	Open	Closed	Closed	Open	Open
2nd (CIP)	Fiq. 4B	Closed	Open	Closed	Open	Closed
3rd (keg change)	Fiq. 4C	Closed	Closed	Open	Open	Open

[0037] Kindly note, that the open/close state of v_7 is dependent on the actual operation mechanism of the valve mechanism 10. In the disclosed example, the valve mechanism 10 requires a pressure larger than atmospheric pressure at the actuator connection 24 of the keg coupler to configure the valve mechanism 10 into 1stvalve configuration 2 and requires an atmospheric pressure to configure into 2nd valve configuration. Accordingly, before closing v_7, the vent valve v_5

is typically opened shortly, to allow for depressurization through port 7. This may be accomplished by a pressure activated piston (not illustrated) of the keg coupler 9 being moveable to push-open valve(s) of the keg to allow for a flow of beer out from the keg and flow of air or COz into the keg 15, both flows being through the keg coupler 19. This pressure activated piston is biased in an upper position by a spring, so that once the pressure on piston is removed, the spring will retract the piston resulting in that the valve(s) of the keg will close.

[0038] In the 3rd chamber configuration, the valve v_7 is open, however, valve v_5 is also open, whereby the pressure at the actuator port 7 is, typically, atmospheric.

[0039] As indicated above, the valve v_7 associated with the actuator port 7 is use to set the valve mechanism in one of the 1st, 2nd or 3rd valve configurations, so that operating the associated with the actuator port 7 to configures the valve mechanism 10 into one of the 1st, the 2nd or 3rd configuration.

[0040] Figs. 2A-C schematically illustrate the 1st, the 2nd and the 3rd valve configurations. The grey shaded objects represent a flow path, that is in

- Fig. 2A a fluid connection is provided between keg inlet 14 and keg pressure outlet 11, and another fluid connection is provided between beer inlet 12 and beer outlet 13 is provided. No cross fluid connection is provided between these two fluid connections.
- Fig. 2B a fluid connection is provided between the keg inlet 14 and the beer outlet 13. The keg pressure outlet 11 and the beer inlet 12 are shut-off.
- Fig. 3C a fluid connection is provided between keg pressure outlet 11 and keg inlet 14. The beer outlet 13 and the beer inlet 12 are shut-off.

[0041] Thus, the following configurations are to be provided, in preferred embodiments, for the common chamber in combination with the valve mechanism:

Table 2

Mode of operation	Chamber configuration	Valve configuration
Beer dispense	1st chamber configuration	1st valve configuration
CIP	2nd chamber configuration	2nd valve configuration
Keq change	3rd chamber configuration	3rd valve configuration

[0042] As indicated above, the valve mechanism 10 in the illustrated example configured so that it sets it self in either of the three valve configuration in response to the actuator connection 24 being pressurised or not, and pressurization of the actuator connection 24 is controlled inter alia by the valve associated with the actuator port being open or closed.

[0043] As a certain chamber configuration in preferred embodiments should match a certain valve configuration, and the valve configuration is settable by the pressure at the actuator port 7, the controller 18 is in preferred embodiments configured prior to setting into to one of said chamber configurations, to close or open said valve (v_7).

[0044] Reference is made in particular to Fig. 3A which illustrates an embodiments in which the common chamber 2 is provided a concavity in a housing 29 and a wall member 30 covers concavity.

[0045] While the above disclosure of the device and keg coupler is based on that the keg coupler need either a single input pressure or no pressure at the actuator connection 24 to provide one of the three valve configurations, other keg couplers may need a further pressure or no pressure at a further actuator connection to one of the three valve configurations. To this, a preferred embodiments of the has a further actuator port 7A is associated with an electrical or pneumatic controllable shut-off valve v_{7A} associated with the further actuator port 7A to control a flow of fluid through the further actuator port 7A individually from each of the other of said associated valves v_3, v_4, v_5, v_6, v_7. Such an embodiment is disclosed schematically in Fig. 5A. As illustrated in Fig. 5A a further actuator port 7A is provided so that two actuator ports 7, 7A are provided. The further actuator port 7A is fluidically connected via the further valve v_{7A} associated with the further actuator port 7A to a further actuator connection of the keg coupler 9. The valve v_{7A} associated with the further actuator port 7A is controllable by the controller 18 in the same or similar manner as the other associated valves.

[0046] In the embodiment illustrated in Fig. 3A, the air port 3, the cleaning agent port 4 and the vent port 5 are provided in the wall member 30. In illustrated embodiment, these ports 3, 4 and 5 are formed by openings going through the wall member 30. As will be detailed below, the embodiment of Figs. 3A-C and Figs. 4A-C further comprises a rail 20 (see Fig. 3B) onto which the housing 29 is attached in a manner so that at least a rim of the wall member 30 abuts a surface of the rail 20. The rail 20 has through going openings mating with the air port 3, the cleaning agent port 4, and the vent port 5. When the housing is attached to the rail 20, the wall member 30 and surfaces of the housing abutting the rail 20 seals the common chamber 2, so that flow into and out from the common cavity is restricted to through the ports. As disclosed above, a gasket 36 may be introduced to seal the common cavity.

[0047] As also illustrated in inter alia Fig. 3A, pressure port 6 and actuator port 7, and when provided the further actuator port 7A (see description below), may be provided in the housing 29.

[0048] With reference in particular to Fig. 4B elements of the associated valves are detailed. As seen in Fig. 4B each associated valve a valve stem 31 having a valve disc 32 at one end of the valve stem (31). For the valves v_3 v_4 and v_5 associated with the air port 3, the cleaning agent port 4 and the vent port 5, a seal 33 is arranged on a surface of the disc 32 facing a port. The seal is typically made from rubber and may be attached to the surface of the disc 32 by glue. For the valves v_6 and v_7 associated with the pressure port 6 and the actuator port 7 an O-ring, typically made from rubber, is arranged in a groove encircling the disc 32. The O-ring is arranged to seal between the disc 32 and seat provided in the housing 29 to provide a closing of the pressure port 6 and actuator port 7 (see e.g. Fig. 3B).

[0049] Each of valve stems 31 is reciprocatable arranged in the housing between a first position in which the valve disc closes the associated port and a second position in which the valve disc does not close the associated port. In Fig. 3A, the valves v_3 v_4, v_5, v_6, v_7 are shown in the second position, whereas in Fig. 3B the valves v_3 v_4, v_5, V_6, v_7 are shown in the first position.

[0050] In the illustrated embodiments, the reciprocatable movement of the stems 31 is provided by the electrical actuator 19 comprising and electrical motor, which rotates a threaded spindle 34 engaging with a thread provided in valve body 35 from which the valve stem 31 protrudes. Thus, by powering the electrical motor of the actuator, the spindle 34 rotates which is translated into a translatory motion of the valve body and thereby also the valve stem. A gear box may be included between the electrical motor and the threaded spindle 34 to change the ratio of rotation of the spindle in relation to rotation of the electrical motor. To prevent rotation of the valve body 35 relatively to the housing 29, the valve body 35 has non-rotational symmetric section which mate a similar shape provided in the housing 29 to prevent rotation of the valve body 35. In the illustrated embodiments, the non-rotational symmetric section has two opposite flat surfaces. Further, the valve body 35 may comprise an O-ring, as illustrated, to seal the valve body 35 against the housing 29.

[0051] Preferred embodiments of a device may comprise a rail 20. Such a rail is shown inter alia in Fig. 3B in a cross sectional view. A rail 20 may typically have a longitudinal length being substantially longer than a width of the housing. Inside the rail 20, an air channel 21, a cleaning agent channel 22 and a vent channel 23 are formed and a section of said rail 20 forms a part of the wall 30 member. These channels are connected with respectively the air port 3, said cleaning agent port 4 and the vent port 5 by an opening extending from the channel and forms at least a part of respectively the air port 3, the cleaning agent port 4 and the vent port 5. By this, a fluid flowing in one of the channel may flow into the common chamber 2 by opening the valve associated with the port in question and can be prevented by flowing into the common chamber 2 by closing the valve associated with the port in question.

[0052] In Fig. 3A, an optional gasket 36 is positioned to provide a seal between the housing 29 and the wall member 30 and to seal the ports 3, 4 and 5 against the valve discs 32 (see Fig. 4B). Thus, the gasket has openings forming part of the ports. The gasket 36 is only illustrated in Fig. 3A although forming part of the embodiment of Figs. 3B and Figs. 4A-C.

[0053] In preferred embodiments the rail 20 is configured to supply fluid to a plurality of common chambers 2. This may be accomplished by arranging a plurality of commons chambers 2 side-by-side in a longitudinal direction of the rail and providing openings for each common chambers extending from the channels and forming at least a part of part of the air port 3, the cleaning agent port 4 and the vent port 5. By such an arrangement a plurality of kegs 15 may be connected in parallel to the device for dispensing beer, and air pressure to the keg, feeding of cleaning agent, venting and connection to pressure port can be provided individually for each keg. In embodiments comprising a plurality of common chambers 2, the associated valves for the one common chamber 2 are preferably controllable independently from associated valves of remaining common chambers 2.

[0054] In embodiments comprising a rail 20, a section of the wall member 30 forms part of a delimiting wall section of the common chamber 2, and a housing 29 attached to the wall part forms delimiting wall section(s) of said common chamber 2 so that said common chamber 2 is formed as a void delimited by the section of the wall member and the housing 29.

[0055] In preferred embodiments, the controller 18 is configured to receive a control signal instantiating setting the associated valves into one of said chamber configuration. Preferably, the controller is configured to receive the control signal wirelessly or by a wired connection. In the embodiment shown in Fig. 3C, an electrical connector 29 is provided through which control signal may be communicated to the controller 18. Accordingly, a remote device electrically connected the with electrical connector 29 by a wire and devices with suitable input elements such as buttons can be used to provide control signal to the controller 18.

[0056] In general, beer dispensing systems involving kegs most often uses air or COz to pressurize the keg. In embodiments involving beer bags, atmospheric air is often the preferred choice. To adapt such a preferred choice, a preferred embodiments of the device comprising or being connectable to a source of pressurised air, wherein the air port 3 is fluidically connected through said valve v_3 associated with said air port 3 to said source of pressurised air.

[0057] Devices according to preferred embodiments are preferably designed with at least a dual purpose, namely to provide pressurization of the keg and cleaning in place (CIP). For the CIP purpose, the device may advantageously comprise a source of cleaning fluid or being connectable to a source of cleaning fluid. To this, the cleaning agent port 4 is fluidically connected through the valve v_4 associated with said cleaning agent port 4 to the source of cleaning fluid.

[0058] During use of a device according to a preferred embodiment, a method of operating the device involves instructing the controller 18 to set the associated valves in one of the 1st or the 2nd chamber configuration. Instruction the controller typically refers to sending control signal(s) to the controller 18 upon receipt of which the controller set the associated valves in accordance with the 1st or 2nd configuration desired.

[0059] In relation to embodiments involving the 3rd chamber configuration, the method of operating the device involves instructing said controller (18) to set the associated valves in one of the 1st , the 2nd or the 3rd chamber configuration.

ITEMIZED LIST OF PREFERRED EMBODIMENTS

[0060]

Item 1. A device (1) for a beer dispensing system, said device comprising:

- a common chamber (2) having:
    - an air port (3), a cleaning agent port (4), a vent port (5), a pressure port (6) and an actuator port (7), wherein each of said ports being associated with an electrical or pneumatic controllable shut-off valve (v_3, v_4, v_5, v_6, v_7) to control a flow of fluid through the ports individually from each other;
- an electronic controller (18) being electrical connected with an actuator (19) of each of said associated valves (v_3, v_4, v_5, v_6, v_7), said actuators being configured to open and close each of said valves (v_3, v_4, v_5, v_6, v_7) individually by said controller (18) providing an electrical control signal to said actuators;
- said electronic controller (18) being configured for setting said associated valves in at least two chamber configurations:
    - a 1st chamber configuration in which said valves (v_3, v_6) associated with said air port (3) and said pressure port (6) are open, and in which said valves (v_4, v_5) associated with said cleaning agent port (4) and said vent port (5) are closed,
    - a 2nd chamber configuration in which said valves (v_4, v_6) associated with said cleaning agent port (4) and said pressure port (6) are open, and in which said valves (v_3, v_5) associated with said air port (3) and said vent port (5) are closed.

Item 2. A device according to item 1, wherein said controller is configured to provide said 1st chamber configuration by

- open, if closed, said valves (v_3, v_6) associated with said air port (3) and said pressure port (6),
- close, if open, said valves (v_4, v_5) associated with said cleaning agent port (4) and said vent port (5).

Item 3. A device according to item 1 or 2, wherein said controller is configured to provide said 2nd chamber configuration by

- open, if closed, said valves (v_4, v_6) associated with said cleaning agent port (4) and said pressure port (6)
- close, if open, said valves (v_3, v_5) associated with said air port (3) and said vent port (5).

Item 4. A device (1) according to any one of the preceding items, wherein the controller (18) is configured for setting said associated valves in a

- 3rd chamber configuration in which said valves (v_5, v_6) associated with said vent port (5) and said pressure port (6) are open, and in which said valves (v_3, v_4) associated with said air port (3) and said cleaning agent port (4) are closed.

Item 5. A device according to item 4, wherein said controller (18) is configured to provide said 3rd chamber configuration by

- open, if closed, said valves (v5, v6) associated with said vent port (5) and said pressure port (6)
- close, if open, said valves (v3, v4) associated with said air port (3) and said cleaning agent port (4) are closed.

Item 6. A device according any one of the preceding items, wherein said controller is configured prior to setting into to one of said chamber configurations, close or open said valve (v_7).

Item 7. A device according to any one of the preceding items, wherein said common chamber (2) is provided a concavity in a housing (29) and a wall member (30) covering said concavity.

Item 8. A device according to any one of the preceding items, wherein said device comprises a further actuator port, wherein said further actuator port being associated with an electrical or pneumatic controllable shut-off valve (v_{7A}) to control a flow of fluid through the further actuator port (7A) individually from each of the other of said associated valves (v_3, v_4, v_5, v_6, v_7).

Item 9. A device according to item 7 or 8, wherein

- said air port (3), said cleaning agent port (4) and said vent port (5) are provided in said wall member (N), and
- said pressure port (6) and said actuator port (7), and when dependent on claim 8 said further actuator port (7A), are provided in said housing (N).

Item 10. A device according to any one of the preceding items 7-9, wherein said associated valves each comprising a valve stem (31) having a valve disc (32) at one end of said valve stem, wherein each of said valve stems (N) is reciprocatable arranged in said housing between a first position in which said valve disc closes said associated port and a second position in which said valve disc does not close said associated port.

Item 11. A device according to any one of the preceding items 7-10, wherein the device comprises a rail (20) in which an air channel (21), a cleaning agent channel (22) and a vent channel (23) are formed, a section of said rail (20) forms a part of said wall (30) member and from a surface of which said air port (3), said cleaning agent port (4) and said vent port (5) extend to respectively said air channel (21), said cleaning agent channel (22) and said vent channel (23).

Item 12. A device according to item 11, wherein a section of said wall member forms part of a delimiting wall section of said common chamber (2), and a housing (29) attached to said wall part forms delimiting wall section(s) of said common chamber (2) so that said common chamber (2) is formed as a void delimited by said section of said wall member and said housing (N).

Item 13. A device according to any one of the preceding items, wherein said controller being configured to receive a control signal instantiating setting said associated valves into one of said chamber configuration, preferably said controller is configured to receive said control signal wirelessly or by a wired connection.

Item 14. A system for dispensing beer, said system comprising a device according to any one of the preceding items and a source of pressurised air or being connectable to a source of pressurised air, wherein said air port (3) is fluidically connected through said valve (v_3) associated with said air port (3) to said source of pressurised air.

Item 15. A system according to item 14, said system comprising a source of cleaning fluid or being connectable to said source of cleaning fluid, where said cleaning agent port (4) is fluidically connected through said valve (v_4) associated with said cleaning agent port (4) to said source of cleaning fluid.

Item 16. A method of operating the device according to any one of the preceding items, the method comprising:

- instructing said controller (18) to set the associated valves in one of the 1st or the 2nd chamber configuration.

Item 17. A method according to item 16, when dependent on item 4, the method comprising

- instructing said controller (18) to set the associated valves in one of the 1st, the 2nd or the 3rd chamber configuration.

LIST OF REFERENCE SYMBOLS USED:

[0061]

1 Device for a beer dispensing system
2 Common chamber
3 Air port
4 cleaning agent port

5	Vent port
6	Pressure port
7	Actuator port
7A	Further actuator port
9	Keg coupler
10	Valve mechanism
11	Keg pressure outlet
12	Beer inlet
13	Beer outlet
14	Keg inlet
15	Keg
16	Beer bag
17	Fluid connection
18	Controller
19	Electrical actuator
20	Rail
21	Air channel
22	Cleaning agent channel
23	Vent channel
24	Actuator connection
24A	Further actuator connection
25	Actuator port connecting tube (from actuator port 7)
26	Pressure port connecting tube (from pressure port 6)
27	Casing
28	Electrical connector
29	Housing
30	Wall member
31	Valve stem
32	Valve disc
33	Seal
34	Threaded spindle
35	Valve body
36	Gasket
V_3	Valve associated with air port 3
V_4	Valve associated with cleaning agent port 4
V_5	Valve associated with vent port 5
V_6	Valve associated with pressure port 6
V_7	Valve associated with actuator port 7
V_{7A}	Valve associated with further actuator port 7A

Claims

1. A device (1) for a beer dispensing system, said device comprising:

- a common chamber (2) having:
  - an air port (3), a cleaning agent port (4), a vent port (5), a pressure port (6) and an actuator port (7), wherein each of said ports being associated with an electrical or pneumatic controllable shut-off valve (v_3, v_4, v_5, v_6, v_7) to control a flow of fluid through the ports individually from each other;
- an electronic controller (18) being electrical connected with an actuator (19) of each of said associated valves (v_3, v_4, v_5, v_6, v_7), said actuators being configured to open and close each of said valves (v_3, v_4, v_5, v_6, v_7) individually by said controller (18) providing an electrical control signal to said actuators;
- said electronic controller (18) being configured for setting said associated valves in at least two chamber configurations:
  - a 1st chamber configuration in which said valves (v_3, v_6) associated with said air port (3) and said pressure port (6) are open, and in which said valves (v_4, v_5) associated with said cleaning agent port (4) and said vent

port (5) are closed,
◦ a 2nd chamber configuration in which said valves (v_4, v_6) associated with said cleaning agent port (4) and said pressure port (6) are open, and in which said valves (v_3, v_5) associated with said air port (3) and said vent port (5) are closed.

2. A device according to claim 1, wherein said controller is configured to provide said 1st chamber configuration by

• open, if closed, said valves (v_3, v_6) associated with said air port (3) and said pressure port (6),
• close, if open, said valves (v_4, v_5) associated with said cleaning agent port (4) and said vent port (5)

and/or said controller is configured to provide said 2nd chamber configuration by

• open, if closed, said valves (v_4, v_6) associated with said cleaning agent port (4) and said pressure port (6)
• close, if open, said valves (v_3, v_5) associated with said air port (3) and said vent port (5)

3. A device (1) according to any one of the preceding claims, wherein said controller (18) is configured for setting said associated valves in a

• 3rd chamber configuration in which said valves (v_5, v_6) associated with said vent port (5) and said pressure port (6) are open, and in which said valves (v_3, v_4) associated with said air port (3) and said cleaning agent port (4) are closed, preferably said controller (18) is configured to provide said 3rd chamber configuration by
• open, if closed, said valves (v5, v6) associated with said vent port (5) and said pressure port (6), and
• close, if open, said valves (v3, v4) associated with said air port (3) and said cleaning agent port (4) are closed.

4. A device according any one of the preceding claims, wherein said controller is configured prior to setting into to one of said chamber configurations, close or open said valve (v_7).

5. A device according to any one of the preceding claims, wherein said common chamber (2) is provided a concavity in a housing (29) and a wall member (30) covering said concavity.

6. A device according to any one of the preceding claims, wherein said device comprises a further actuator port, wherein said further actuator port being associated with an electrical or pneumatic controllable shut-off valve (v_{7A}) to control a flow of fluid through the further actuator port (7A) individually from each of the other of said associated valves (v_3, v_4, v_5, v_6, v_7).

7. A device according to claim 5 or 6, wherein

• said air port (3), said cleaning agent port (4) and said vent port (5) are provided in said wall member (N), and
• said pressure port (6) and said actuator port (7), and when dependent on claim 8 said further actuator port (7A), are provided in said housing (N).

8. A device according to any one of the preceding claims 5-7, wherein said associated valves each comprising a valve stem (31) having a valve disc (32) at one end of said valve stem, wherein each of said valve stems (N) is reciprocatable arranged in said housing between a first position in which said valve disc closes said associated port and a second position in which said valve disc does not close said associated port.

9. A device according to any one of the preceding claims 5-8, wherein the device comprises a rail (20) in which an air channel (21), a cleaning agent channel (22) and a vent channel (23) are formed, a section of said rail (20) forms a part of said wall (30) member and from a surface of which said air port (3), said cleaning agent port (4) and said vent port (5) extend to respectively said air channel (21), said cleaning agent channel (22) and said vent channel (23).

10. A device according to claim 9, wherein a section of said wall member forms part of a delimiting wall section of said common chamber (2), and a housing (29) attached to said wall part forms delimiting wall section(s) of said common chamber (2) so that said common chamber (2) is formed as a void delimited by said section of said wall member and said housing (N).

11. A device according to any one of the preceding claims, wherein said controller being configured to receive a control signal instantiating setting said associated valves into one of said chamber configuration, preferably said controller is

configured to receive said control signal wirelessly or by a wired connection.

12. A system for dispensing beer, said system comprising a device according to any one of the preceding claims and a source of pressurised air or being connectable to a source of pressurised air, wherein said air port (3) is fluidically connected through said valve (v_3) associated with said air port (3) to said source of pressurised air.

13. A system according to claim 12, said system comprising a source of cleaning fluid or being connectable to said source of cleaning fluid, where said cleaning agent port (4) is fluidically connected through said valve (v_4) associated with said cleaning agent port (4) to said source of cleaning fluid.

14. A method of operating a device according to any one of the preceding claims 1-11 or a system according to claims 12 or 13, the method comprising:

- instructing said controller (18) to set the associated valves in one of the 1st or the 2nd chamber configuration.

15. A method according to claim 14, when dependent on claim 3, the method comprising

- instructing said controller (18) to set the associated valves in one of the 1st , the 2nd or the 3rd chamber configuration..

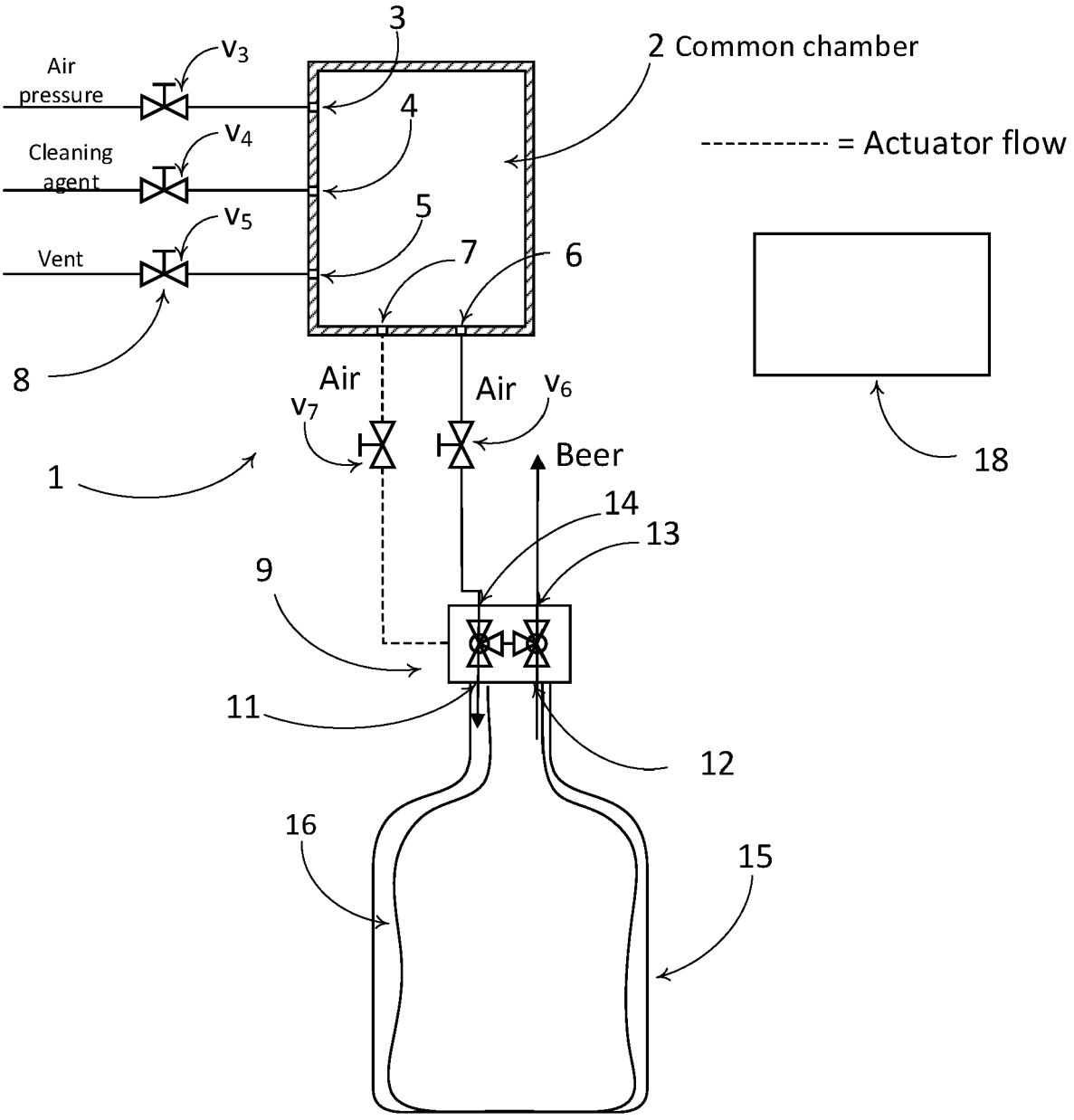

3
2 Common chamber
Air pressure
V_3
4
Cleaning agent
V_4
= Actuator flow
5
V_5
Vent
7
6
8
Air
Air
V_6
V_7
18
1
Beer
14
13
9
11
12
16
15

Fig. 1A

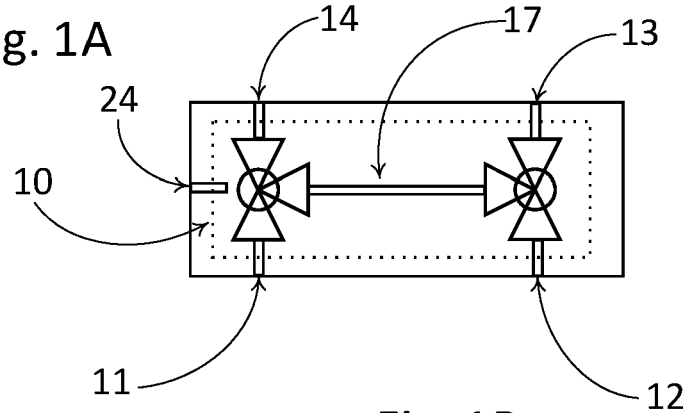

14
17
13
24
10
11
12

Fig. 1B

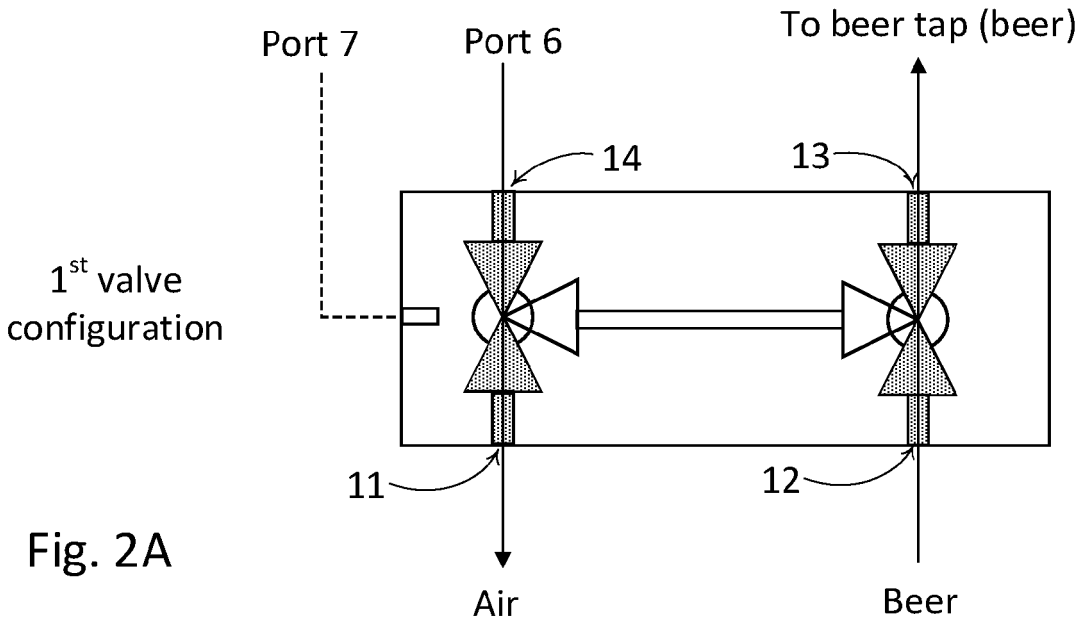
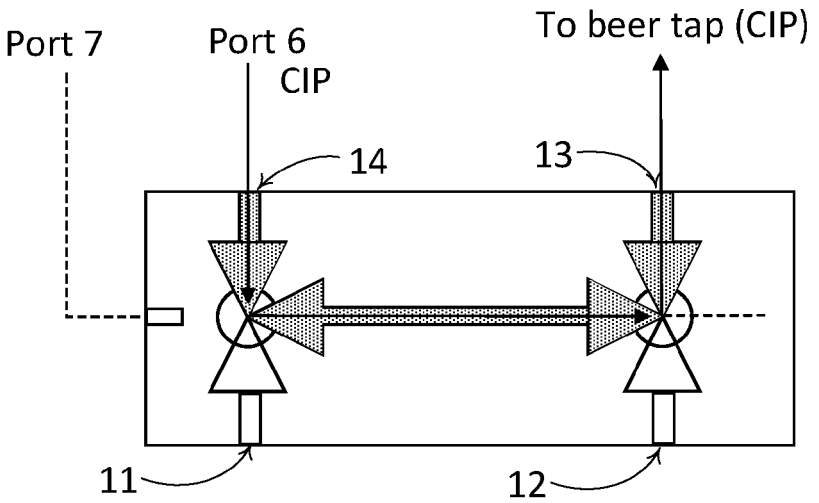


Fig. 2A



2nd valve configuration

Fig. 2B

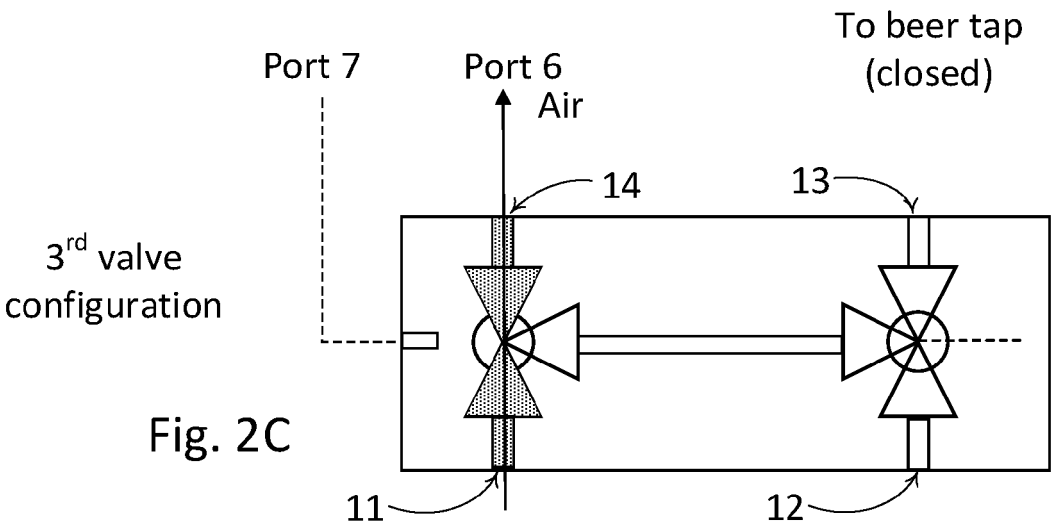


Fig. 2C

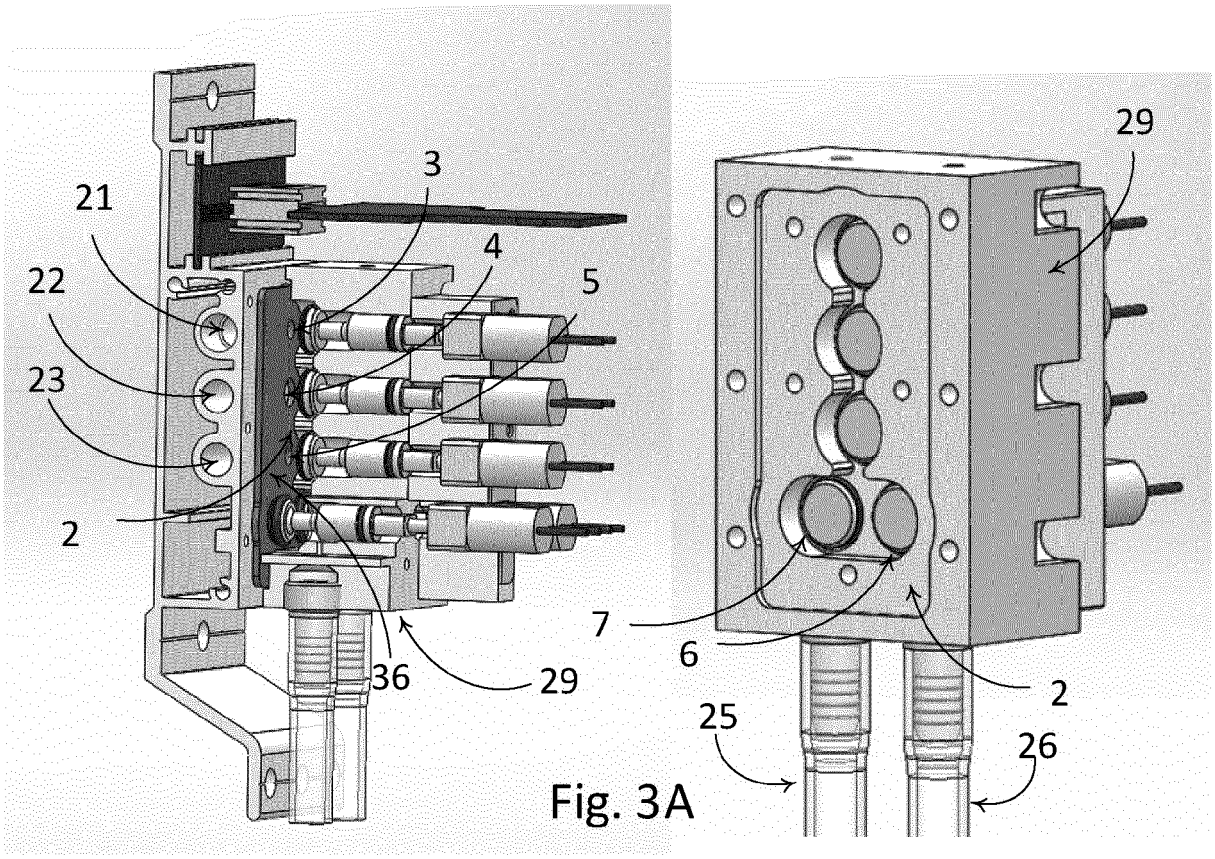


Fig. 3A

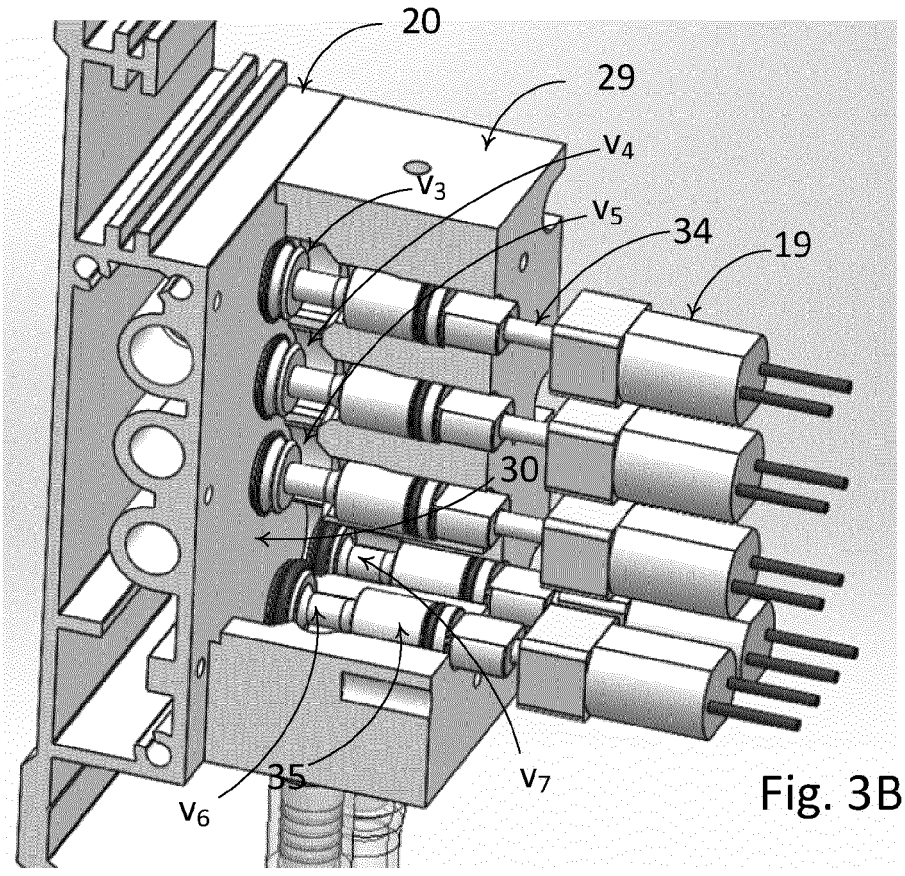


Fig. 3B

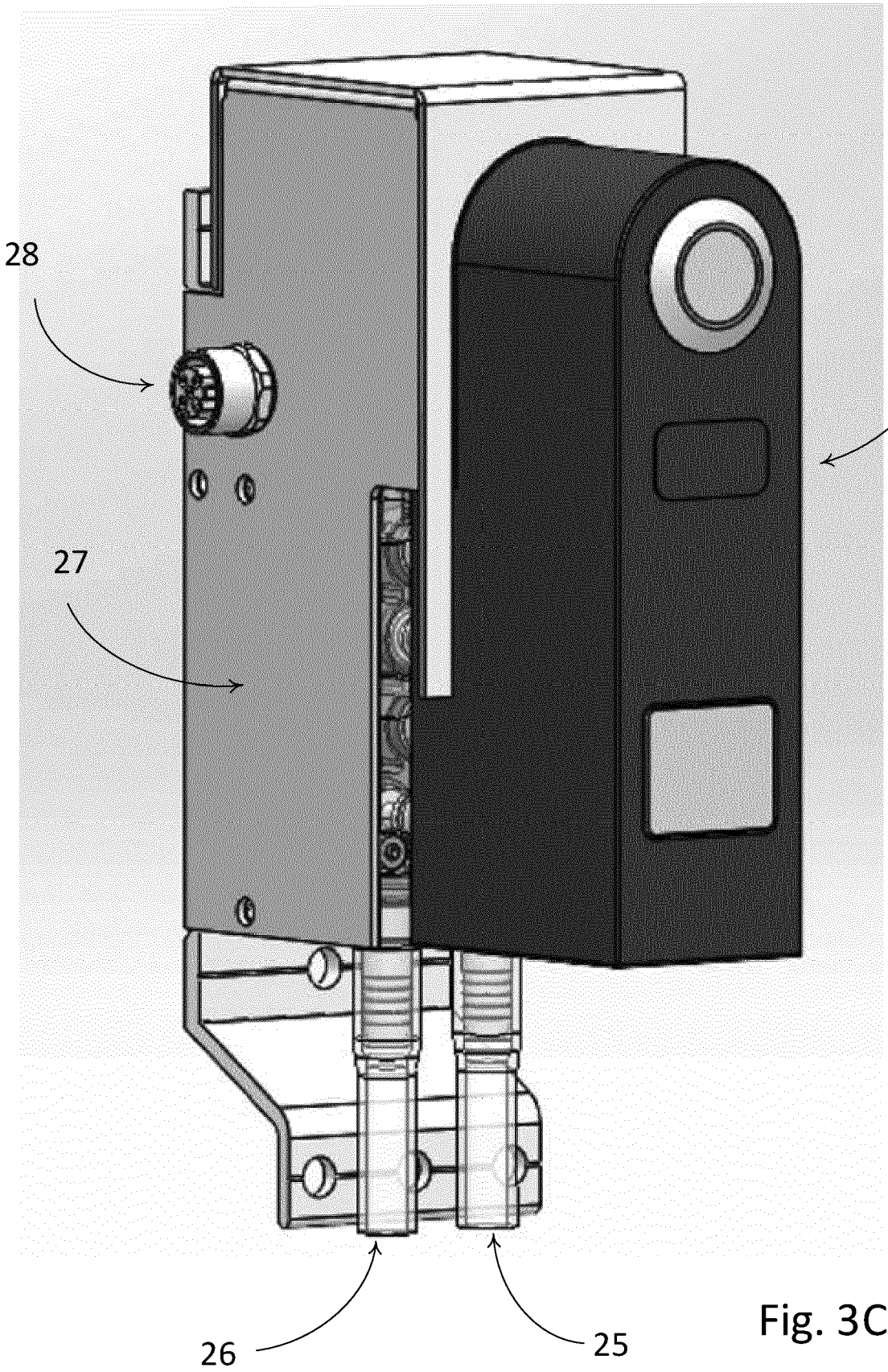


Fig. 3C

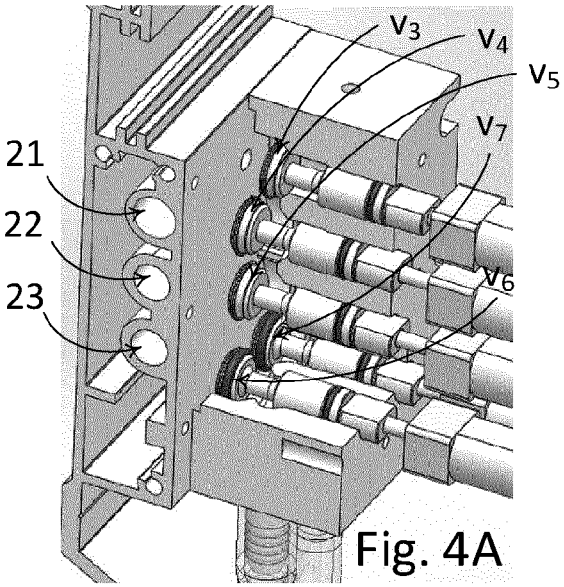


Fig. 4A

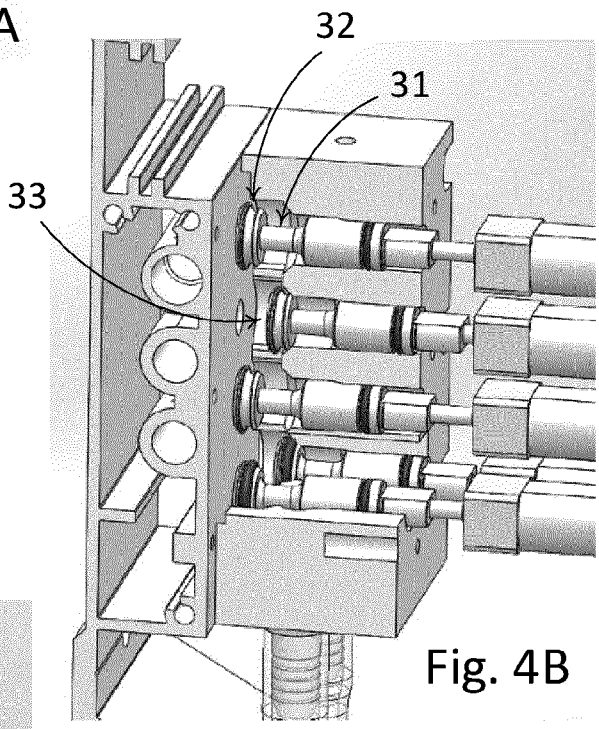


Fig. 4B

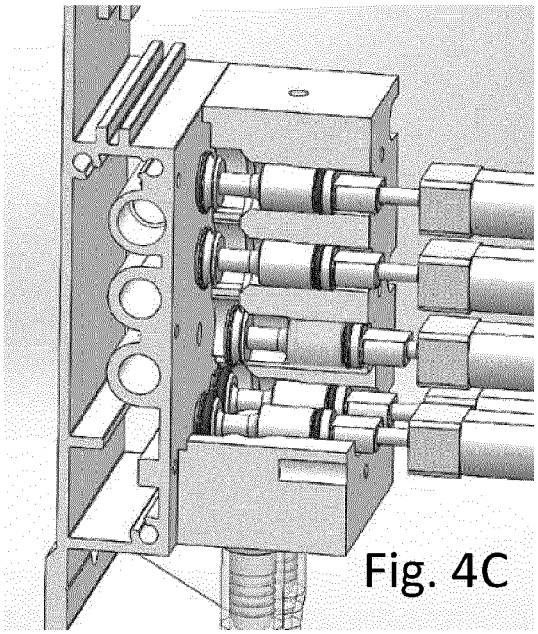


Fig. 4C

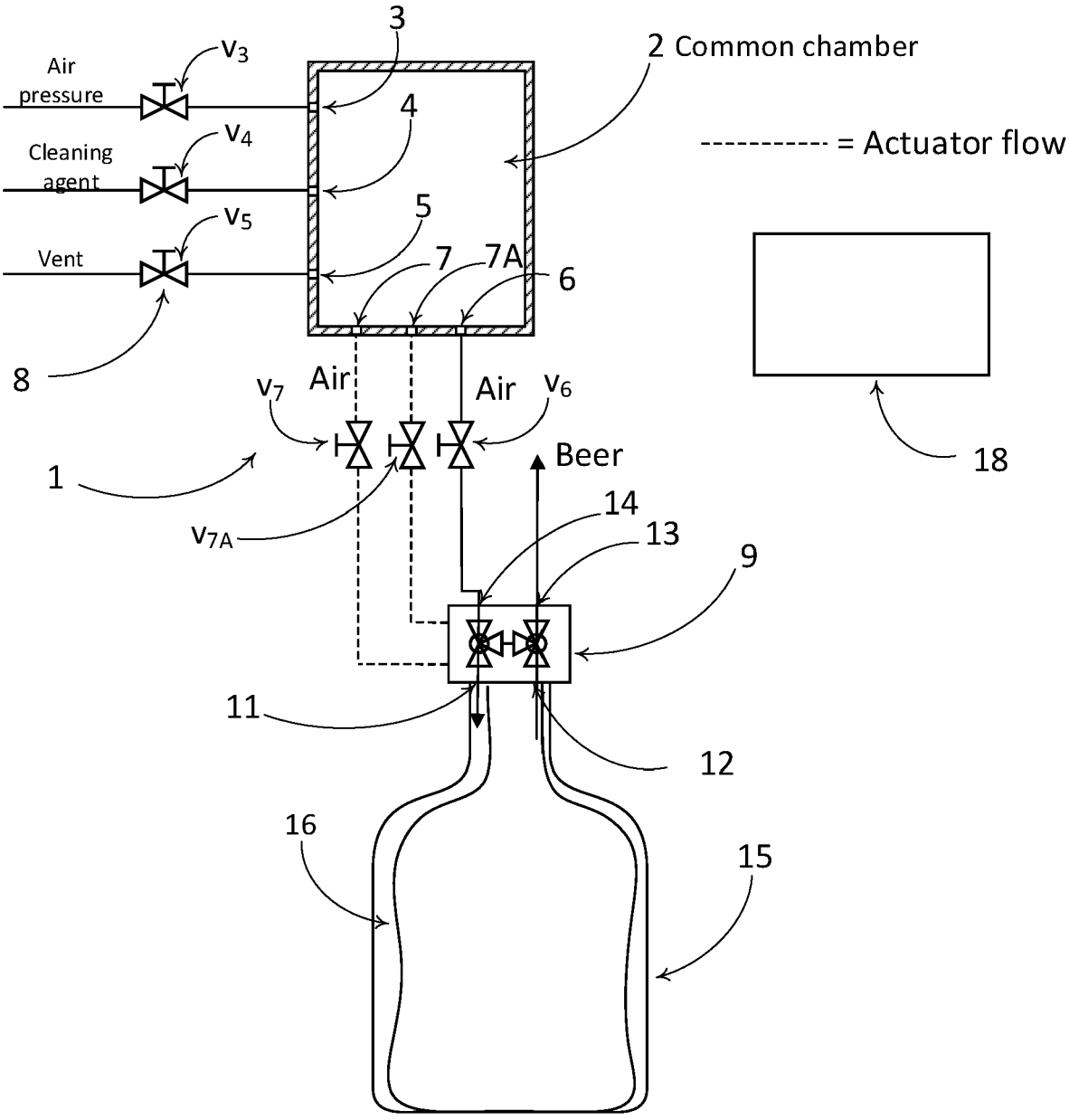

3
2 Common chamber
Air pressure
v_3
4
Cleaning agent
v_4
= Actuator flow
5
Vent
v_5
7
7A
6
8
v_7
Air
Air
v_6
18
1
Beer
14
v_{7A}
13
9
11
12
16
15

Fig. 5A

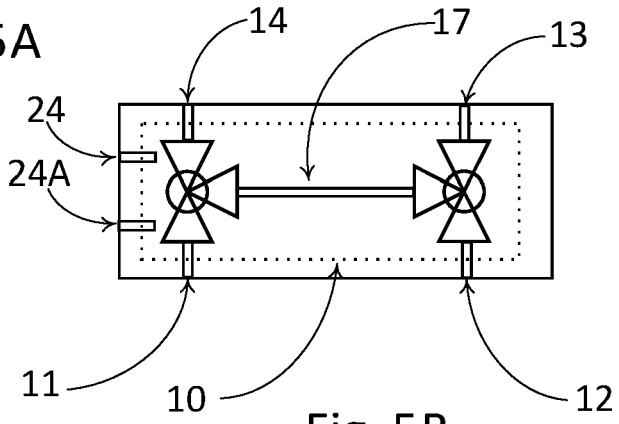

14
17
13
24
24A
11
10
12

Fig. 5B

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 21 8095

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2019/081720 A1 (CARLSBERG BREWERIES AS [DK]) 2 May 2019 (2019-05-02) * page 19, line 13 - page 20, line 26; figures 1, 2 * -----	1-15	INV. B67D1/04 B67D1/07 B67D1/08
A	US 5 762 096 A (MIRABILE PAUL J [US]) 9 June 1998 (1998-06-09) * column 1, line 5 - line 10 * * column 3, line 60 - column 6, line 24 * * column 7, line 18 - line 25; figures 1-4 * -----	1-15	
A	EP 3 904 276 A1 (SUNTORY HOLDINGS LTD [JP]) 3 November 2021 (2021-11-03) * paragraphs [0011], [0012]; figures 1, 2 * -----	1-15	
A	US 2023/069295 A1 (ALGÜL YUSUF CAN [TR] ET AL) 2 March 2023 (2023-03-02) * paragraph [0091] - paragraph [0100]; figures 1-4 * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 May 2024	Schultz, Tom

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons
.....
& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 21 8095

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

07-05-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019081720 A1	02-05-2019	CN 111278764 A	12-06-2020
		CN 115010078 A	06-09-2022
		DK 3700854 T3	28-03-2022
		EP 3700854 A1	02-09-2020
		EP 3998227 A1	18-05-2022
		ES 2907788 T3	26-04-2022
		HU E058129 T2	28-07-2022
		PL 3700854 T3	28-03-2022
		PT 3700854 T	03-03-2022
		US 2020247657 A1	06-08-2020
		US 2022315407 A1	06-10-2022
		WO 2019081720 A1	02-05-2019
US 5762096 A	09-06-1998	NONE	
EP 3904276 A1	03-11-2021	CN 113226973 A	06-08-2021
		EP 3904276 A1	03-11-2021
		JP 6567157 B1	28-08-2019
		JP 2020104890 A	09-07-2020
		KR 20210105909 A	27-08-2021
		WO 2020138103 A1	02-07-2020
US 2023069295 A1	02-03-2023	EP 4085021 A2	09-11-2022
		US 2023069295 A1	02-03-2023
		WO 2021137775 A2	08-07-2021

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82