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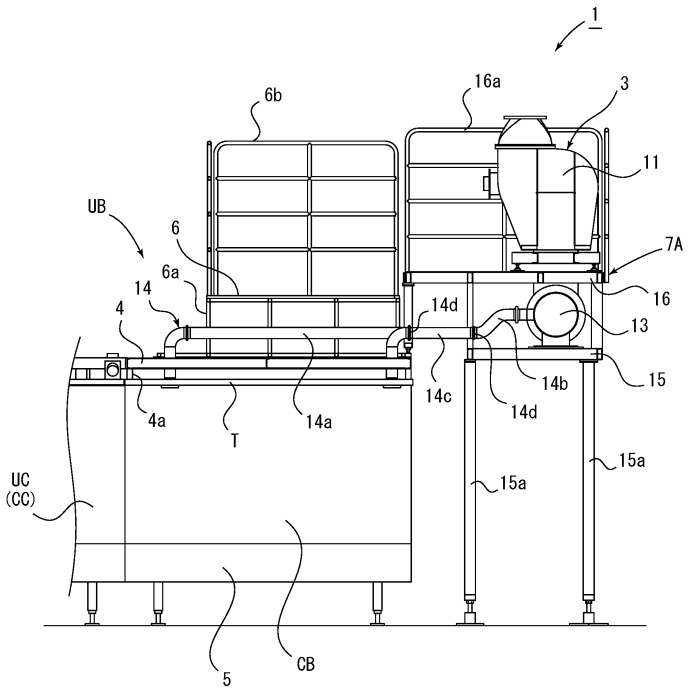
(54) **PROCESSING SYSTEM**

(57) A prompt piping operation during assembling is enabled. The present invention relates to a processing device in which a cradle 7A configured to be transportable in a separate manner from a chamber CB is provided in a position adjacent to the chamber CB accommodating a processing device in an inner portion thereof, and discharging device (exhaust device 3) is provided on the cradle 7A. An exhaust duct 14 includes a chamber-side duct 14a fixed to a unit base 4 provided in an upper portion of the chamber CB and provided in a state in which one end is communicatively connected to the inner portion of the chamber CB and the other end is oriented toward the cradle 7A, and a cradle-side duct 14b fixed to the cradle 7A and provided in a state in which one end is connected to the exhaust device 3 via a manifold 13 and the other end is oriented toward the chamber. It is configured such that, at the time of assembly in a processing plant, the other end of the chamber-side duct 14a and the other end of the cradle-side duct 14b are communicatively connected.

Fig. 2



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a processing system provided with: a chamber accommodating a processing device in an inner portion thereof; a duct communicatively connected to the inner portion of the chamber through the duct; and feeding device that feeds a fluid to the inner portion of the chamber or discharging device that discharges the fluid from the inner portion of the chamber through the duct.

Description of the Related Art

[0002] Conventionally, a processing system provided with a chamber accommodating a processing device thereinside has been known. For example, as a filling system for filling a container with a beverage, one provided with a filling device inside the chamber has been known. The filling system is further provided with a chamber accommodating a sterilization device for sterilizing the container and a chamber accommodating a washing device for washing the sterilized container, the chambers being coupled to constitute the filling system (Japanese Laid-Open Patent Application No. 2015-157651).

[0003] In addition, since the above-described filling system carries out pressure control inside the chamber by feeding and discharging sterile air to and from the chamber, it is configured such that a duct is connected to an upper portion of the chamber, and sterile air feeding device and sterile air discharging device provided outside the chamber are to be connected to the duct.

[0004] Manufacture of such a processing system does not take place in a processing plant actually processing products, but typically takes place in a manufacturing plant manufacturing the processing system. The processing system is configured to be temporarily assembled in the manufacturing plant, divided into chambers, transported to the processing plant by transportation means such as a truck, and then assembled.

[0005] As described above, since the processing system is transported in a disassembled state from the manufacturing plant to the processing plant, conventionally, it has been configured to provide the above-described duct arranged outside the chamber by gauging after arranging the chambers in predetermined positions in the processing plant.

[0006] In this case, when the feeding device is arranged on a floor surface of the processing plant, the duct needs to be provided from the feeding device on the floor surface to an upper portion of the chamber, resulting in problems of complex piping and an extended length of the duct.

[0007] In addition, in the case of providing the duct by gauging, an operation of fixing the duct while newly arranging a frame (stanchion) for fixing the duct in an upper portion of the chamber is required, resulting in problems such as an extended period, as long as several months, required for completing all piping.

[0008] In view of the above-described problems, the present invention provides a processing system that enables a prompt piping operation during assembling.

SUMMARY OF THE INVENTION

[0009] In this regard, a processing system according to the invention of claim 1 comprises: a chamber accommodating a processing device in an inner portion thereof; a duct communicatively connected to the inner portion of the chamber; and feeding device that feeds a fluid to the inner portion of the chamber through the duct or discharging device that discharges the fluid from the inner portion of the chamber through the duct, characterized in that:

a cradle for supporting the feeding device or the discharging device in alignment with a height of a ceiling of the chamber is provided in a position adjacent to the chamber, and is configured to be transportable in a separate manner from the chamber;
the duct includes a chamber-side duct fixed to an upper portion of the chamber and provided in a state in which one end is communicatively connected to the inner portion of the chamber and the other end is oriented toward the cradle, and a cradle-side duct fixed to the cradle and provided in a state in which one end is connected to the feeding device or the discharging device and the other end is oriented toward the chamber; and
the other end of the chamber-side duct and the other end of the cradle-side duct are communicatively connected.

Advantageous Effect of Invention

[0010] According to the above-described invention, among the ducts to be arranged in the upper portion of the chamber, the chamber-side duct and the cradle-side duct are fixed to the chamber and the cradle in the manufacturing plant in advance, and thus does not create problems during transportation.

[0011] And then, by arranging the chamber and the cradle supporting the feeding device in predetermined positions in a plant as a transportation destination, the chamber-side duct and the cradle-side duct can be easily connected and arrangement of external ducts can be completed, whereby the need for gauging is eliminated and efficient assembling is enabled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIG. 1 is an arrangement view of a filling system according to the present embodiment;
FIG. 2 is a lateral view of a sterilization unit; and
FIG. 3 is a diagram explaining external ducts arranged in an upper portion of the sterilization unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Hereinafter, the embodiment illustrated in the drawings is explained. FIG. 1 shows a filling system 1 as a processing system that fills a container as a product with a beverage. The filling system 1 is provided with, in an order of processes with respect to the container: an inspection unit UA that inspects an empty container; a sterilization unit UB that sterilizes an empty container; a cleaning unit UC that cleans the sterilized container; a filler/capper unit UD that fills the container with the beverage and attaches a cap to the container; and a discharging unit UE that discharges the capped container.

[0014] The units UA to UE are respectively provided with first to fifth chambers CA to CE, an inner space of which is separated from an outer portion. In addition, the filling system 1 is provided with five cradles 7A to 7E for supporting exhaust device 3 as a discharging device, air feeding device 17 as a feeding device and the like described later, separately from the first to fifth chambers CA to CE.

[0015] Processing devices, which are not illustrated, for processing the container are provided in the first to fifth chambers CA to CE respectively. Specifically: an inspection device is provided inside the first chamber CA constituting the inspection unit UA; a sterilization device is provided inside the second chamber CB constituting the sterilization unit UB; a cleaning device is provided inside the third chamber CC constituting the cleaning unit UC; a filling device and a capping device are provided inside the fourth chamber CD constituting the filler/capper unit UD; and a conveyor is provided inside the fifth chamber CE constituting the discharging unit UE, respectively.

[0016] In addition, conveying device, which is not illustrated, for conveying the container is provided in the first to fifth chambers CA to CE, and is configured to convey the container from the inspection unit UA to the filler/capper unit UD by means of for example a conventionally well-known star wheel, and then discharge the container by means of the conveyor provided in the discharging unit UE.

[0017] The filling system 1 having the above-described configuration is configured to be manufactured in the manufacturing plant, and transported to and assembled in a filling plant where beverage filling is performed. In the present embodiment, the filling system 1 is configured to be transported in a state of being disassembled into the chambers CA to CE and the cradles 7A to 7E.

[0018] The filling system 1 is configured to be assembled in the filling plant on the basis of an assembly drawing, by: joining the first to fifth chambers CA to CE; arranging the cradles 7A to 7E in predetermined positions; providing feeding device and discharging device on an outer side; and providing the ducts between each chamber and the feeding device.

[0019] The filling system 1 of the present embodiment is configured such that, the fourth chamber CD constituting the filler/capper unit UD is configured with a positive pressure higher than that of the third chamber CC constituting the cleaning unit UC, and the third chamber CC is configured with a positive pressure higher than that of the second chamber CB constituting the sterilization unit UB.

[0020] In order to create such a differential pressure between the chambers, sterile air feeding device 2 for feeding sterile air is connected to the fourth chamber CD, and exhaust device 3 as discharging device for discharging the sterile air from the second chamber CB is connected to the second chamber CB.

[0021] It is configured such that, when the sterile air feeding device 2 feeds the sterile air to the inner portion of the fourth chamber CD while the exhaust device 3 discharges the sterile air from the inner portion of the second chamber CB, the sterile air passes from the fourth chamber CD to the second chamber CB through the third chamber CC, and is lastly discharged from the second chamber CB by the exhaust device 3, whereby the above-mentioned differential pressure between the chambers C is created.

[0022] On the other hand, the second chamber CB constituting the sterilization unit UB and the first chamber CA constituting the inspection unit UA are configured such that the sterile air in the second chamber CB does not flow into the first chamber CA.

[0023] For example, by forming an exhaust room in a portion of the second chamber CB adjacent to the first chamber CA, and discharging the sterile air from the exhaust room by the exhaust device 3, atmosphere of the sterilization unit UB can be prevented from flowing into the inspection unit UA.

[0024] Note that the configuration for creating a differential pressure specifically described above is disclosed in Japanese Laid-Open Patent Application No. 2015-157651, and a more detailed description thereof is omitted.

[0025] In addition, the filling system 1 of the present embodiment is configured to clean the inner portions of the second to fourth chambers CB to CD with a cleaning liquid after carrying out an operation of filling the container with the beverage for a predetermined period of time, and it is configured such that the cleaning liquid is fed to the second to fourth chambers CB to CD by cleaning liquid feeding device, which is not illustrated, installed in the filling plant.

[0026] FIG. 2 and FIG. 3 show the sterilization unit UB, and, as described above, a sterilization device which is not illustrated is provided inside the second chamber CB constituting the sterilization unit UB.

[0027] The sterilization device is configured to be installed on a base member 5 provided on a floor surface of the filling plant, and the second chamber CB accommodating the sterilization device is configured to be formed by providing metallic panels on an upper side and a lateral side of the base member 5.

[0028] On the lateral side panel constituting the second chamber CB, although not illustrated, through openings are formed with respect to the first chamber CA and the third chamber CC which are adjacent, and a hatch and an observation window for maintenance of the sterilization device are provided.

[0029] A unit base 4 is joined to an upper portion of a top face T, which is the upper side panel, via a joint member 4a, the unit base 4 comprising a frame made of iron beams arranged in substantially the same shape as an outer peripheral edge of a planar shape of the second chamber CB, and provided with a bracket for fixing the ducts described later.

[0030] In addition, a chamber-side aisle 6 on which an operator can walk is provided in an upper portion of the unit base 4 via a grid-like base 6a, and a gap required for arranging the ducts is formed between the unit base 4 and the chamber-side aisle 6.

[0031] Furthermore, a handrail 6b for prevention of fall of the operator is provided in an upper portion of the chamber-side aisle 6.

[0032] The sterilization unit UB is provided with, in a position adjacent to the second chamber CB, the exhaust device 3 for exhaust from the inner portion of the second chamber CB, the exhaust device 3 being supported by the cradle 7A according to the present invention.

[0033] The exhaust device 3 of the present embodiment is provided with an exhaust blower 11 and a motor 12 for driving the exhaust blower 11 as shown in FIG. 2 and FIG. 3, and a manifold 13 is connected to the exhaust blower 11.

[0034] Although explanation by illustration is omitted, the manifold 13 comprises: an upper side portion connected to a connection opening 11a of the exhaust blower 11 via a connection opening 13a; a lower side portion arranged below the exhaust blower 11; and a substantially U-shaped curved portion joining the upper portion and the lower portion.

[0035] As shown in FIG. 2 and FIG. 3, the cradle-side duct 14b is configured to be connected to the lower side portion of the manifold 13, and connected to the chamber-side duct 14a via a connection duct 14c, whereby the inner portion of the second chamber CB and the exhaust blower 11 are communicatively connected.

[0036] In the present embodiment, the chamber-side duct 14a, the cradle-side duct 14b and the connection duct 14c constitute an exhaust duct 14 according to the present invention. The cradle-side duct 14b is connected to the exhaust blower 11 via the manifold 13.

[0037] To the second chamber CB, a plurality of (seven in the present embodiment) exhaust ducts 14 are connected. The exhaust ducts 14 are configured to discharge air from a plurality of positions in the second chamber CB, respectively.

[0038] The plurality of exhaust ducts 14 are configured to be connected to the manifold 13, whereby, when the exhaust blower 11 is driven by the motor 12, air is discharged from respective positions in the second chamber CB via the manifold 13 and the exhaust ducts 14 communicatively connected to the exhaust blower 11.

[0039] As shown in FIG. 2, the cradle 7A comprises: a supporting member 15 provided in alignment with the height of the unit base 4 (ceiling according to the present invention) of the second chamber CB; a cradle-side aisle 16 on which the operator can walk provided above the supporting member 15; and a handrail 16a provided in an upper portion of the cradle-side aisle 16.

[0040] The supporting member 15 is installed on the floor surface of the filling plant by means of a plurality of leg portions 15a, and the manifold 13 and the cradle-side duct 14b are configured to be fixed to the supporting member 15.

[0041] In addition, the supporting member 15 is provided in a position in alignment with the height of the unit base 4 of the second chamber CB to which the chamber-side duct 14a is provided. More specifically, the cradle-side duct 14b connected to the manifold 13 is configured to be supported at such a height as to be connected as horizontally as possible to the chamber-side duct 14a arranged on the unit base 4 of the second chamber CB.

[0042] Note that the supporting member 15 and the unit base 4 of the second chamber CB are not necessarily completely aligned in height, and may be different in height to such a degree that connection between the chamber-side duct 14a and the cradle-side duct 14b is not disturbed. In addition, although the supporting member 15 of the present embodiment is provided in a position slightly spaced apart from the second chamber CB, the supporting member 15 may also be provided in such a position as to come into contact with the second chamber CB.

[0043] In a similar manner to the chamber-side aisle 6 provided in an upper portion of the second chamber CB, the cradle-side aisle 16 comprises a plate-like member such as a grating, and the exhaust blower 11 and the motor 12 constituting the exhaust device 3 are configured to be fixed to the cradle-side aisle 16.

[0044] In the present embodiment, the cradle-side aisle 16 is provided to protrude toward the second chamber CB more than the supporting member 15 does. This prevents formation of a gap between the cradle-side aisle 16 and the chamber-side aisle 6.

[0045] The cradle-side aisle 16 of the present embodiment is provided in a position slightly higher than the chamber-side aisle 6 provided to the second chamber CB, because the manifold 13 needs to be provided between the supporting member 15 and the cradle-side aisle 16, while the position of the chamber-side aisle 6 needs to be lowered in order to clear the height limit of the second chamber CB during transportation. Conse-

quently, if there is no such limit, the aisles may be provided at the same height.

[0046] As described above, the lower side portion of the manifold 13 is fixed to the supporting member 15 in the cradle 7A, and the exhaust blower 11 is fixed to an upper portion of the cradle-side aisle 16.

[0047] Of these, the manifold 13 is provided in alignment with the height of the unit base 4 of the second chamber CB by means of the supporting member 15, thus enabling substantially horizontal arrangement and connection of the chamber-side duct 14a provided on the unit base 4 of the second chamber CB, the connection duct 14c, and the cradle-side duct 14b connected to the manifold 13.

[0048] In addition, the chamber-side duct 14a, the connection duct 14c, and the cradle-side duct 14b are configured to be arranged below the chamber-side aisle 6 and the cradle-side aisle 16, so as not to be obstacles for the operator walking on the chamber-side aisle 6 and the cradle-side aisle 16.

[0049] On the other hand, the exhaust blower 11 and the motor 12 are provided on the cradle-side aisle 16, whereby the operator can easily carry out a maintenance operation thereof.

[0050] Next, the plurality of exhaust ducts 14 provided between the second chamber CB and the exhaust device 3 are configured to be connected to the manifold 13, to discharge air from the plurality of positions in the second chamber CB to create a differential pressure between the chambers C, and maintain the pressure balance in the second chamber CB.

[0051] As shown in FIG. 2, one end of the chamber-side duct 14a passes through the top face T of the second chamber CB in a predetermined position, and is oriented to the inner portion of the second chamber CB. And then, the chamber-side duct 14a extends perpendicularly from the one end and changes the orientation thereof to a horizontal direction parallel to the unit base 4 and the top face T, and a connection portion 14d provided at the other end is arranged toward the cradle 7A.

[0052] On the other hand, one end of the cradle-side duct 14b is connected to the exhaust blower 11 via the manifold 13, and the connection portion 14d provided at the other end is arranged toward the second chamber CB.

[0053] The connection portion 14d provided at the other end of the chamber-side duct 14a is provided in substantially the same position as the outer peripheral edge of the second chamber CB. The connection portion 14d provided at the other end of the cradle-side duct 14b is also provided in substantially the same position as the outer peripheral edge of the supporting member 15 in the cradle 7A.

[0054] The connection duct 14c is configured to connect between the other end of the chamber-side duct 14a and the other end of the cradle-side duct 14b, and provided in a gap between the second chamber CB and the supporting member 15 of the cradle 7A, with both end portions being connected to the connection portion 14d of the chamber-side duct 14a and to the connection portion 14d of the cradle-side duct 14b.

[0055] Note that the connection portion 14d at the other end of the chamber-side duct 14a is not necessarily required to be provided in substantially the same position as the outer peripheral edge of the second chamber CB, and may be provided in a position slightly toward the inside of the second chamber CB, or slightly projecting therefrom. Similarly, the connection portion 14d provided at the other end of the cradle-side duct 14b may also be provided in a position slightly toward the inside of the supporting member 15, or slightly projecting therefrom. The positions of the connection portions may also be applied to other ducts described below.

[0056] During manufacture of the filling system 1, the chamber-side duct 14a and the cradle-side duct 14b are configured to be fixed to the unit base 4 of the second chamber CB and to the supporting member 15 of the cradle 7A in the manufacturing plant.

[0057] In other words, the arrangement positions of the chamber-side duct 14a and the cradle-side duct 14b are designed in advance. It is configured such that installing the second chamber CB and the cradle 7A in predetermined positions in the filling plant arranges the chamber-side duct 14a and the cradle-side duct 14b in the predetermined positions. Then, by just connecting these ducts by the connection duct 14c, arrangement of the exhaust duct 14 is completed.

[0058] Note that, omitting the exhaust duct 14 to the connection duct 14c and providing the cradle-side duct 14b up to substantially the same position as the outer peripheral edge of the cradle-side aisle 16 enables direct connection between the chamber-side duct 14a and the cradle-side duct 14b.

[0059] On the other hand, although a gap is formed between the second chamber CB and the supporting member 15 of the cradle 7A in the present embodiment, getting rid of the gap enables direct connection between the chamber-side duct 14a and the cradle-side duct 14b.

[0060] Next, in the inner portion of the second chamber CB, microbicide spraying device as the sterilization device that sprays hydrogen peroxide vapor onto the container, and drying device that dries the hydrogen peroxide vapor thus sprayed, are provided.

[0061] It is configured such that, of these, to the microbicide spraying device, a hydrogen peroxide aqueous solution is fed by microbicide feeding device, which is not illustrated and provided outside the second chamber CB.

[0062] On the other hand, it is configured such that, to the drying device, cleaned air is fed by air feeding device 17 as the feeding device. The air feeding device 17 comprises an air feeding blower 17a provided outside the second chamber CB, and an air filter 17b provided adjacent to the second chamber CB.

[0063] Of the air feeding device 17, the air filter 17b is, in a similar manner to the exhaust device 3, supported

by the cradle 7B provided adjacent to the second chamber CB. Note that an air feeding blower installed in the feeding plant may be used as the air feeding blower 17a; however, in a case of manufacturing the air feeding blower 17a in the manufacturing plant, the air feeding blower 17a may be supported by the cradle 7B.

[0064] The air feeding device 17 is configured to feed air to two positions in the second chamber CB, and therefore two air feeding ducts 18 (ducts of the present invention) are provided between the air feeding device 17 and the second chamber CB.

[0065] Although explanation by illustration is omitted, the cradle 7B supporting the air filter 17b is provided with, in a similar manner to the cradle 7A supporting the exhaust device 3: a supporting member supporting a manifold which is not illustrated; and a cradle-side aisle, on which the operator can walk, supporting the air filter 17b.

[0066] The supporting member is provided in alignment with the height of the unit base 4 of the second chamber CB, and the cradle-side aisle is provided in alignment with the height of the chamber-side aisle 6 of the second chamber CB.

[0067] The air feeding ducts 18 are arranged, in a similar manner to the exhaust duct 14, in a state of being exposed to the outside of the second chamber CB, and are connected to the air feeding device 17 via the manifold.

[0068] The air feeding duct 18 also comprises: a chamber-side duct 18a fixed to the unit base 4 of the second chamber CB; and a cradle-side duct 18b fixed to the supporting member of the cradle 7B. A connection portion 18c connecting these ducts is provided in a boundary portion between the second chamber CB and the cradle 7B.

[0069] Furthermore, a cleaning liquid duct 19 for circulating cleaning water for cleaning of the second chamber CB is connected to the upper portion of the second chamber CB.

[0070] The cleaning liquid duct 19 is arranged in a state of being exposed to the outside of the second chamber CB, and is fixed to the unit base 4 of the second chamber CB.

[0071] The cleaning liquid duct 19 of the second chamber CB is configured to be joined to a cleaning liquid duct, which is not illustrated, provided on a unit base of the third chamber CC. In the present embodiment, two series of the cleaning liquid duct 19 are configured to be joined to two series of the cleaning liquid duct provided to the third chamber CC.

[0072] The connection portion 19a provided at an end portion of the cleaning liquid duct 19 is provided in the vicinity of a boundary portion between the second chamber CB and the third chamber CC.

[0073] Note that, the cradle 7 supporting the cleaning liquid feeding device may be provided in a position adjacent to the second chamber CB, and the cleaning liquid duct 19 may be connected to the cleaning liquid feeding device via a manifold.

[0074] Next, the cleaning unit UC is provided with a cleaning device in the third chamber CC, the cleaning device being configured to spray a container-cleaning liquid from a cleaning nozzle to clean the container.

[0075] Note that, regarding the configuration related to the cleaning unit UC, explanation of a configuration common with or similar to the sterilization unit UB is omitted.

[0076] On the unit base fixed to an upper portion of the third chamber CC, the cleaning liquid duct, which is to be connected to the cleaning liquid duct 19 arranged in the second chamber CB, is arranged. In addition, a chamber-side aisle on which the operator can walk is provided above the cleaning liquid duct.

[0077] In the present embodiment, container-cleaning liquid feeding device, which feeds the container-cleaning liquid to the cleaning device, is provided outside the third chamber CC. The container-cleaning liquid feeding device is configured to feed the container-cleaning liquid from below the third chamber CC to the cleaning device, and the duct for circulating the container-cleaning liquid is not provided in an upper portion of the third chamber CC.

[0078] However, in a similar manner to the sterilization unit UB, a configuration is possible in which the container-cleaning liquid feeding device is installed on the cradle 7 provided adjacent to the third chamber CC, an external duct for feeding the container-cleaning liquid is arranged in the upper portion of the third chamber CC, and the external duct is connected to the chamber-side duct fixed to the third chamber CC and to the cradle-side duct fixed to the cradle 7.

[0079] The filler/capper unit UD comprises: the sterile air feeding device 2 for creating a differential pressure between the chambers C, provided in an upper portion of the fourth chamber CD; and a filling device for filling the container with the beverage and a capping device for attaching a cap to the container filled with the beverage, provided inside the fourth chamber CD.

[0080] Note that, regarding the configuration related to the following filler/capper unit UD, explanation of a configuration common with or similar to the sterilization unit UB is omitted.

[0081] A unit base is fixed to the upper portion of the fourth chamber CD, and a chamber-side aisle and a handrail are provided in an upper portion of the unit base.

[0082] The sterile air feeding device 2 comprises two air feeding blowers and a cleaning filter which is not illustrated. The air feeding blowers and the cleaning filter are fixed to the chamber-side aisle and connected to the air feeding ducts, whereby the air feeding ducts is configured to be feed the sterile air to a plurality of positions in the fourth chamber, respectively.

[0083] Note that, in a similar manner to the sterilization unit UB, the sterile air feeding device 2 may also be arranged on the cradle 7 provided adjacent to the fourth chamber CD, and the air feeding duct may comprise a chamber-side duct fixed to the fourth chamber CD and a cradle-side duct fixed to the cradle 7.

[0084] The filling device is provided with a plurality of filling nozzles for filling the container with the beverage. A liquid feeding tank 20 for feeding the beverage to the filling device is provided in a position adjacent to the fourth chamber CD, and is supported by a cradle 7C provided adjacent to the fourth chamber CD.

[0085] In addition, although explanation by illustration is omitted, a liquid feeding duct, as a feeding duct provided outside the fourth chamber CD, is arranged between the liquid feeding tank 20 and a rotary joint of the filling device, in a similar manner to the second chamber CD and the exhaust device 3 in the sterilization unit UB.

[0086] The liquid feeding duct also comprises: a chamber-side duct fixed to the unit base of the fourth chamber CD and a cradle-side duct fixed to the cradle 7C being connected. A connection portion between the chamber-side duct and the cradle-side duct is provided in a boundary portion between the fourth chamber CD and the cradle 7C.

[0087] The capping device is provided with a plurality of capping heads for attaching caps to the containers. Cap feeding device for feeding the caps to the capping device is provided in a position adjacent to the fourth chamber CD.

[0088] The cap feeding device is configured to feed the caps from above the fourth chamber CD to the capping device by air conveyance. Conveyance air feeding device 22 as feeding device feeding air to a conveyance path of the caps is provided on a cradle 7D provided adjacent to the fourth chamber CD.

[0089] In addition, an air duct, which is not illustrated, as the feeding duct provided to be exposed to the outside of the fourth chamber CD, is arranged between the conveyance air feeding device 22 and the conveyance path of the caps.

[0090] The air duct also comprises a chamber-side duct fixed to the ceiling of the fourth chamber CD and a cradle-side duct fixed to the cradle 7D. A connection portion between the chamber-side duct and the cradle-side duct is provided in a boundary portion between the fourth chamber CD and the cradle 7D.

[0091] Furthermore, the filling system 1 of the present embodiment is provided with a power supply box 23 that supplies electric power to the sterile air feeding device 2, the exhaust device 3 and the like held in alignment with the height of the unit bases of the chambers C by the cradles 7A to 7D, the power supply box 23 being configured to be supported by a cradle 7E provided adjacent to the fourth chamber CD.

[0092] A cradle-side aisle is provided on the cradle 7E, and the power supply box 23 is fixed to the cradle-side aisle. Cables to the sterile air feeding device 2, the exhaust device 3 and the like are configured to be arranged between the cradle-side aisle and the supporting member.

[0093] Also in each of the chambers C, the cables from the power supply box 23 are configured to be arranged between the chamber-side aisle and the unit base.

[0094] Furthermore, a control panel for controlling the sterile air feeding device 2, the exhaust device 3 and the like may also be provided in a position adjacent to the power supply box 23.

[0095] Such a configuration enables the operator to control each devices provided in the upper portions of the chambers C by using the control panel, thus reducing the need for the operator ascending and descending to and from the positions of the unit bases of the chambers C.

[0096] The filling system 1 having the aforementioned configuration is, as described above, manufactured in the manufacturing plant, transported to the filling plant by the transportation means such as a truck, and then assembled in the filling plant.

[0097] Hereinafter, the sterilization unit UB is described as an example. When the sterilization unit UB is manufactured in the manufacturing plant, the conveying device for the containers and the sterilization device are installed on the base member 5, and are covered by using the metallic panels, to form the second chamber CB.

[0098] In addition, in the manufacturing plant, on the basis of an assembly drawing created in advance, the chamber-side ducts 14a, 18a constituting the exhaust duct 14 and the air feeding duct 18 as the ducts are fixed, and the cleaning liquid duct 19 is fixed, to the base 6a arranged on the unit base 4 fixed to the upper portion of the second chamber CB.

[0099] Furthermore, the chamber-side aisle 6 is fixed to upper portions of the chamber-side ducts 14a, 18a via the base 6a arranged on the unit base 4. Note that the handrail 6a is not fixed to the chamber-side aisle 6 in the manufacturing plant, and is transported in a detached state.

[0100] As described above, it is configured such that in the manufacturing plant, the sterilization device is installed in the inner portion of the second chamber CB, and the upper duct and the chamber-side aisle 6 are fixed to the upper portion thereof, and shipped in this state by the transportation means such as a truck.

[0101] The second chamber CB and the chamber-side aisle 6 are designed and manufactured to have such heights that transportation by the truck or the like is possible, specifically heights satisfying the provisions of the Road Traffic Act.

[0102] In addition, in the manufacturing plant, an operation of fixing the exhaust device 3, which constitutes the sterilization unit UB and discharges the sterile air from the inner portion of the second chamber CB, to the cradle 7A is carried out.

[0103] In other words, the manifold 13 and the cradle-side duct 14b in the exhaust duct 14 are fixed to the supporting member 15, and the exhaust blower 11 and the motor 12 are fixed to the cradle-side aisle 16.

[0104] And then, the cradle 7A is transported in a state in which the leg portions 15a are removed from the supporting member 15 and the handrail 6a is removed from the cradle-side aisle 16.

[0105] The second chamber CB and the cradle 7A thus manufactured in the manufacturing plant are transported by the truck or the like, and then assembled into the sterilization unit UB in the filling plant.

[0106] After installing the second chamber CB in a predetermined position in the filling plant, the cradle 7A supporting the exhaust blower 11 constituting the exhaust device 3 is installed in a position adjacent to the second chamber CB, in a state in which the leg portions 15a are attached to the supporting member 15.

[0107] As a result of installing these, the connection portion 14d of the chamber-side duct 14a constituting the exhaust duct 14 fixed to the unit base 4 of the second chamber CB, and the connection portion 14d of the cradle-side duct 14b connected to the manifold 13 fixed to the cradle 7A supporting the exhaust device 3 are arranged in predetermined positions. Then, by joining these by using the connection duct 14c, piping of the exhaust duct 14 is completed.

[0108] Similarly, the cradle 7B supporting the air filter 17b constituting the air feeding device 17 is installed in a position adjacent to the second chamber CB, in a state in which the leg portions 15a are attached to the supporting member 15.

[0109] This enables connection between the chamber-side duct 18a constituting the air feeding duct 18 fixed to the unit base 4 of the second chamber CB, and the cradle-side duct 18b connected to the manifold 13 fixed to the cradle 7 supporting the air filter 17b, thus completing piping of the air feeding duct 18.

[0110] And then, the cleaning liquid duct 19 arranged on the unit base 4 of the second chamber CB is joined to the cleaning liquid duct arranged on the unit base of the third chamber CC, whereby piping of the cleaning liquid duct 19 between the second chamber CB and the third chamber CC is completed.

[0111] In a similar manner, other units such as the filler/capper unit UD may also be assembled by: installing the fourth chamber CD in the filling plant, installing the cradle 7E supporting the liquid feeding device to the filling device and the cradle 7D supporting the air conveyance device for air-conveying the caps to the capping device in positions adjacent to the fourth chamber CD, and connecting the ducts provided thereto.

[0112] As described in the foregoing, the filling system 1 of the present embodiment enables a piping operation to be quickly carried out during installation in the filling plant.

[0113] In other words, by fixing the ducts to be exposed to the outside of the chambers C to the upper portions of the chambers C and the cradle 7 in advance during manufacture in the manufacturing plant, piping in the filling plant can be completed just by connecting these, whereby the need for piping by gauging in the filling plant is eliminated.

[0114] In the case of piping by gauging in the filling plant, an operation of installing a frame (stanchion) for piping in the upper portion of the chamber C and fixing the ducts to the frame is required, resulting in problems of cumbersomeness of the operation and complexity of the piping.

[0115] In addition, in the present embodiment, since the plurality of cradle-side ducts 14b are brought together by providing the manifold 13 on the cradle 7A, the need for bringing the ducts together by gauging is eliminated, thus enabling efficient attachment of the ducts.

[0116] Furthermore, in the filling system 1 of the present embodiment, since the aisle is provided on the cradle 7 and in the upper portion of the chamber C, and the external duct is arranged below the aisle, maintenance after completion of the filling system 1 is facilitated.

[0117] Note that, although the above embodiment has been described with reference to the filling system 1 for filling the container with the beverage, a processing system with the configuration described in the above embodiment can be obtained as long as the processing system is provided with the processing device in the chamber C and is configured to feed some kind of fluid from an upper portion of the chamber C.

[0118] In addition, although in the above embodiment the exhaust duct 14 and the exhaust device 3 have a configuration in which a plurality of the chamber-side ducts 14a and a plurality of the cradle-side ducts 14b are provided and the manifold 13 is fixed to the cradle 7A, the manifold 13 may also be fixed to the second chamber CB.

[0119] In this case, a plurality of the chamber-side ducts 14a are arranged in the upper portion of the second chamber CB, and the other ends of the plurality of the chamber-side ducts 14a are connected to the manifold 13. On the other hand, one cradle-side duct 14, one end of which is connected to the exhaust blower 11, may be fixed to the cradle 7, and the cradle-side duct 14 may be connected to the manifold 13 via the connection duct 14c or directly.

Reference Signs List

[0120]

1	Filling system
2	Sterile air feeding device
3	Exhaust device (discharging device)
4	Unit base
6	Chamber-side aisle
7A to 7E	Cradle
13	Manifold
14	Exhaust duct (duct)
14a	Chamber-side duct
14b	Cradle-side duct
14c	Connection duct
14d	Connection portion
15	Supporting member
15a	Leg portion
16	Cradle-side aisle
17	air feeding device (feeding device)

CA to CE First to fifth chambers

Claims

1. A processing system comprising: a chamber accommodating a processing device in an inner portion thereof; a duct communicatively connected to the inner portion of the chamber; and feeding device that feeds a fluid to the inner portion of the chamber through the duct or discharging device that discharges the fluid from the inner portion of the chamber through the duct, **characterized in that**:

   a cradle for supporting the feeding device or the discharging device in alignment with a height of a ceiling of the chamber is provided in a position adjacent to the chamber, and is configured to be transportable in a separate manner from the chamber;
   the duct includes a chamber-side duct fixed to an upper portion of the chamber and provided in a state in which one end is communicatively connected to the inner portion of the chamber and the other end is oriented toward the cradle, and a cradle-side duct fixed to the cradle and provided in a state in which one end is connected to the feeding device or the discharging device and the other end is oriented toward the chamber; and
   the other end of the chamber-side duct and the other end of the cradle-side duct are communicatively connected.

2. The processing system according to claim 1, **characterized in that** the other end of the chamber-side duct is provided in alignment with a position of an end portion of the chamber, and the other end of the cradle-side duct is provided in alignment with a position of an end portion of the cradle.

3. The processing system according to claim 1 or 2, **characterized in that**:

   a plurality of the chamber-side ducts and a plurality of the cradle-side ducts are provided;
   a manifold is fixed to the cradle; and
   one end of the plurality of cradle-side ducts is connected to the feeding device or the discharging device via the manifold.

4. The processing system according to claim 1 or 2, **characterized in that**:

   a plurality of the chamber-side ducts are provided;
   a manifold is fixed to the upper portion of the chamber;
   the other end of the plurality of chamber-side ducts is connected to the manifold; and
   the manifold is communicatively connected to the other end of the cradle-side duct.

5. The processing system according to any one of claims 1 to 4, **characterized in that**:

   a chamber-side aisle on which an operator can walk is provided above the chamber-side duct fixed to the chamber and is fixed to be transportable integrally with the chamber; and
   a cradle-side aisle is provided above the cradle-side duct fixed to the cradle and is provided to be transportable integrally with the cradle.

Fig. 1

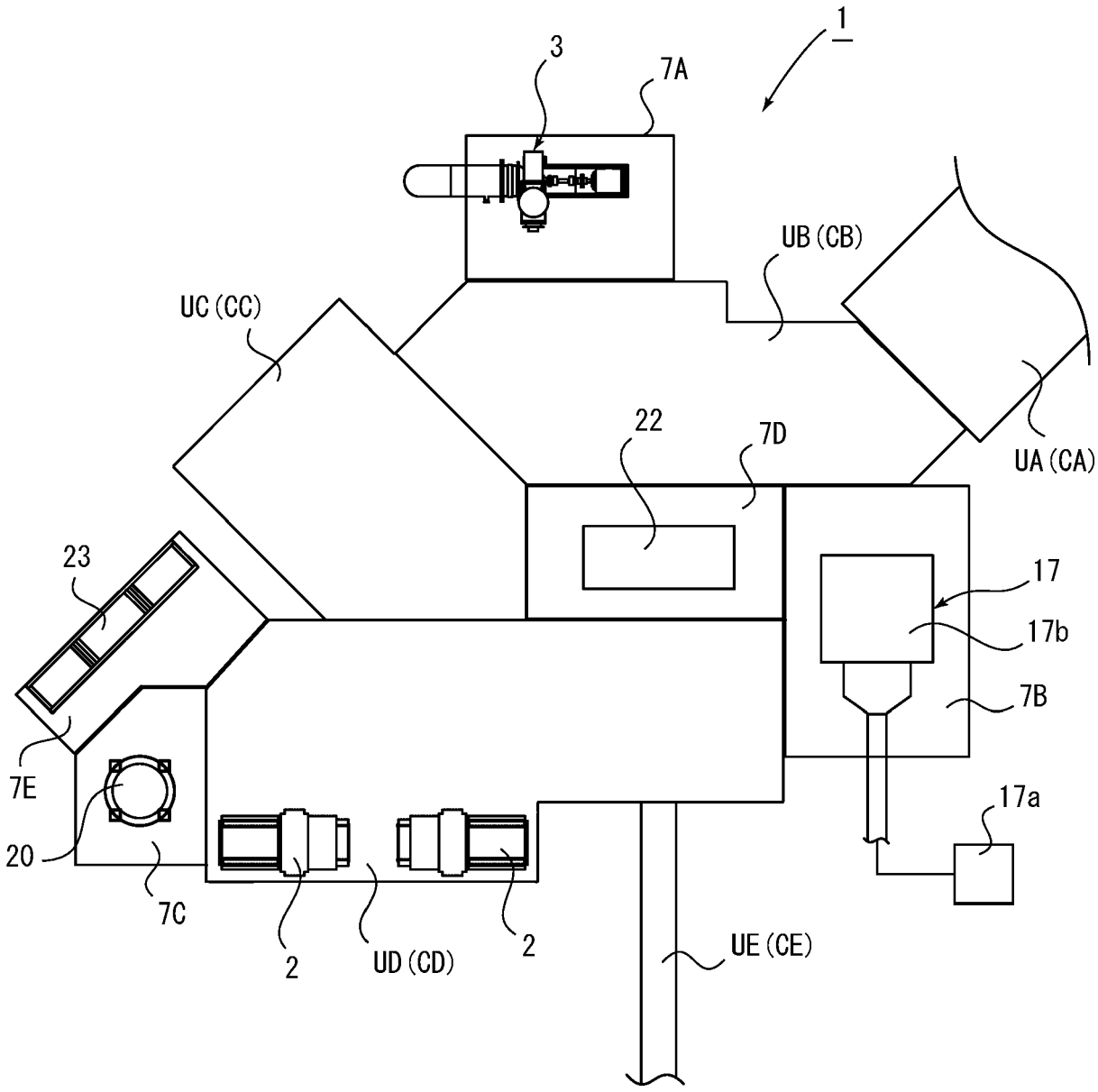
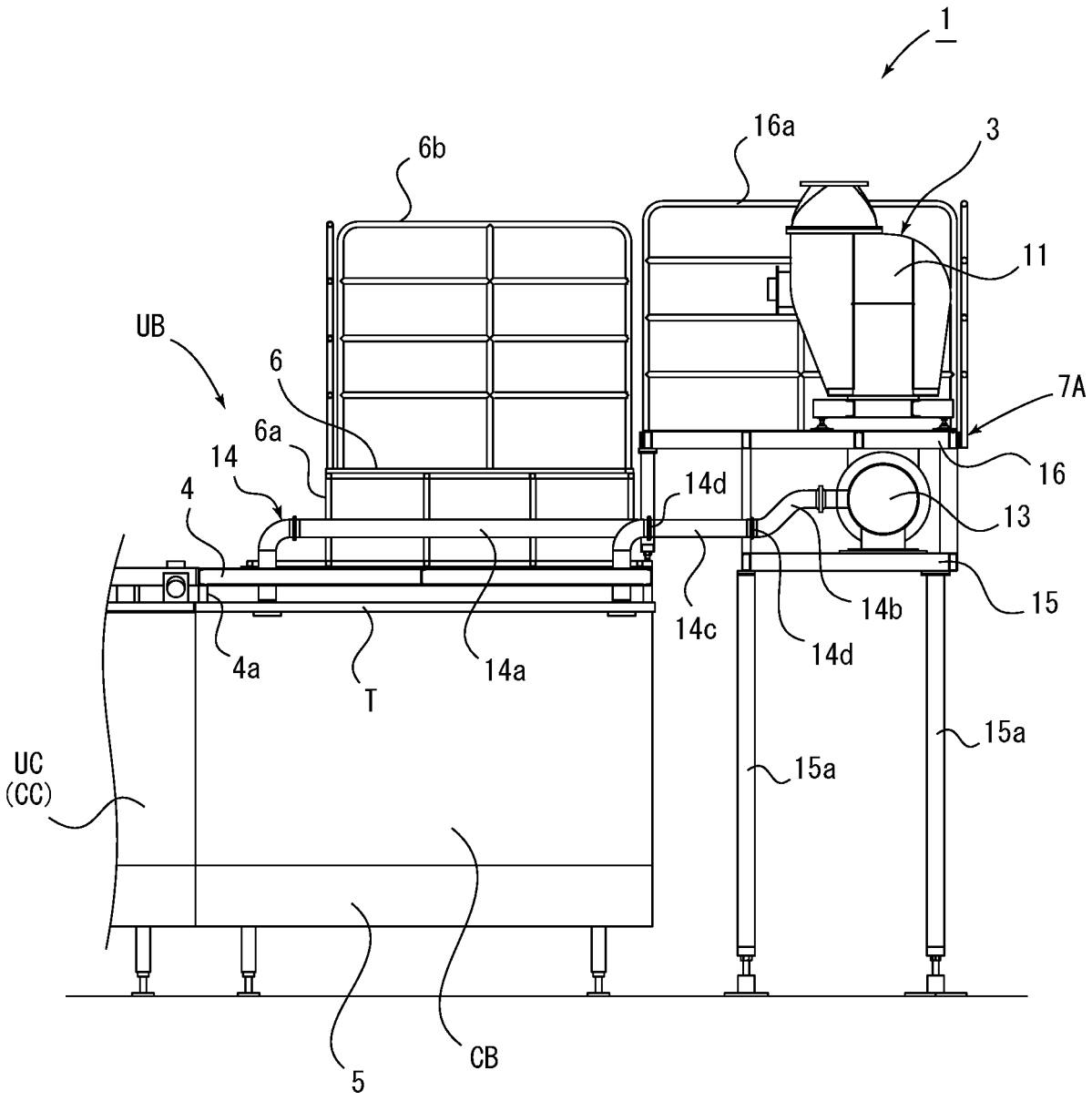


Fig. 2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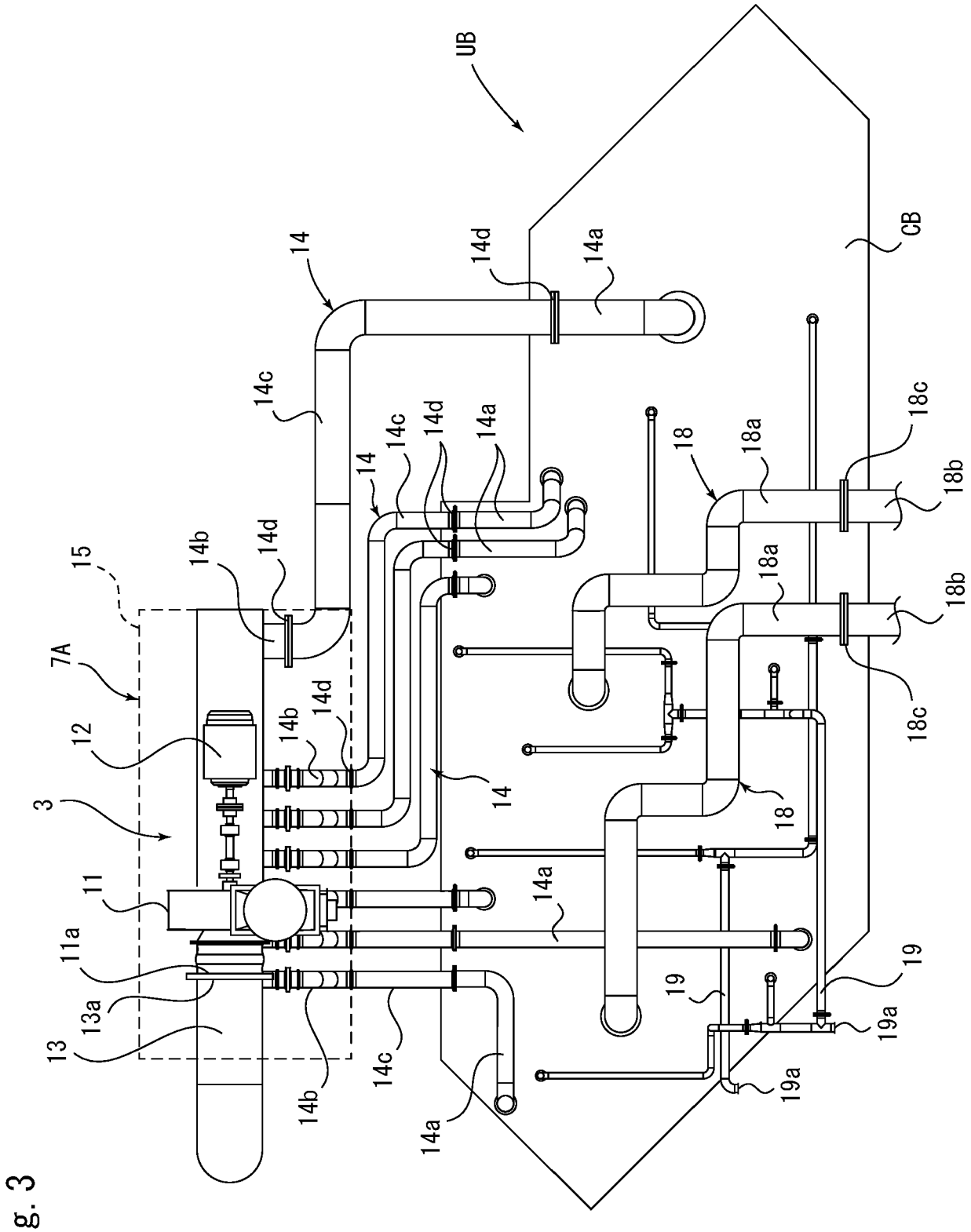
5
CB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19a

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
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