(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 April 2010 (08.04.2010)

PCT

(10) International Publication Number
WO 2010/039438 A1

(51) International Patent Classification:
D06F 39/00 (2006.01) *A47L 11/34* (2006.01)
F22B 1/28 (2006.01) *A47J 27/04* (2006.01)

(21) International Application Number:
PCT/US2009/057231

(22) International Filing Date:
17 September 2009 (17.09.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/102,601 3 October 2008 (03.10.2008) US
12/552,105 1 September 2009 (01.09.2009) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR A STEAMER

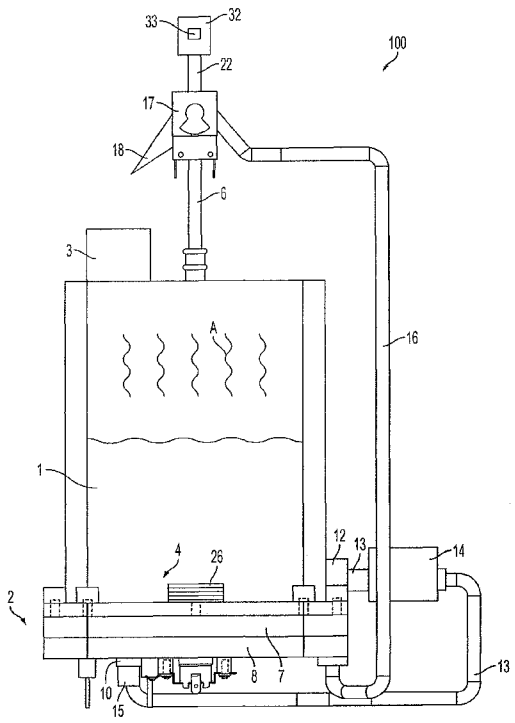

FIG. 1

(57) Abstract: A steam apparatus including a first steam apparatus (1) to produce a first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature and a second steam apparatus (2) to produce a second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature. An output apparatus is configured to receive the first steam and the second steam and output the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam. An atomizer (15) may be included to assist the steam generation.

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ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

APPARATUS AND METHOD FOR A STEAMER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Application Serial No. 61/102,601 entitled, "Apparatus and Method of a Steamer" filed on October 3, 2008 and U.S. Non-Provisional Application Serial No. 12/552,105 entitled, "Apparatus and Method of a Steamer" filed on September 1, 2009, both of which are incorporated herein by reference in their entirety.

BACKGROUND

[0002] Embodiments of the invention relate to an apparatus for a steamer. The use of steam as a tool has been used in a variety of ways. For example, garment steamers, food steamers, steam irons, and steam cleaners utilize the benefits of steam.

[0003] Garment steamers are used to remove wrinkles from clothing via an application of steam. Conventional garment steamers, however, are limited in the type of steam produced and the amount of steam generated. Due to the design of known garment steamers, the steam produced is highly susceptible to outputting water with the steam. The output of water with steam can damage delicate fabrics such as silk.

[0004] Conventional garment steamers and steam irons have difficulty overcoming surface tension of the water used to create the steam. Some garment steamers expend extra heat energy to overcome the tension of a water droplet.

[0005] Food steamers have been designed to allow for faster, cleaner cooking. However, conventional food steamers are limited in the amount and kind of steam which can be produced. Due to the varying compositions of food, different foods may

require different types and amounts of steam for better cooking. A larger amount of steam may allow for faster cooking times.

[0006] Steam cleaners use steam to disinfect surfaces. Conventional steamers are limited in the amount and type of steam which may be produced.

SUMMARY

[0007] According to one aspect of the invention, there is provided a steam apparatus, comprising: a first steam apparatus to produce a first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature; a second steam apparatus to produce a second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature; and an output apparatus configured to receive the first steam and the second steam and output the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam.

[0008] In another embodiment of the invention, the apparatus may include a first steam chamber configured to contain fluid and a second steam chamber disposed adjacent to the first steam chamber. The second steam chamber may define a passage fluidly connected to the first steam chamber to receive fluid from the first steam chamber. A heating element may be disposed within the second steam chamber and be substantially adjacent to the passage. The heating element may be configured to heat the fluid in the first steam chamber to generate a first steam having a humidity level above a predetermined level and having a temperature below a predetermined degree. For example, but not limited to, the first steam may have a temperature of 110 degrees Celsius while under 1.5 bars of absolute pressure. The heating element

may be configured to heat the fluid received in the passage to generate a second steam having a humidity level below the predetermined level and having a temperature above the predetermined degree. A common output conduit may be fluidly coupled to an exit of the passage and may also be fluidly coupled to the first steam chamber. The common output conduit may be configured to receive the first steam and the second steam and output the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam.

[0009] In another exemplary embodiment of the invention, a method is provided. The method for generating steam may include heating fluid in the first steam chamber with the heating element to generate the first steam from evaporation of the fluid; channeling the first steam to the common output conduit; pumping the fluid from the first steam chamber to the passage in the second steam chamber; heating the fluid in the passage with the heating element; channeling the fluid through the passage to generate second steam; channeling the second steam to the common output conduit; and outputting the first steam, the second steam, or the hybrid steam from the common output conduit.

[00010] Embodiments of the invention may overcome the surface tension of the water while using less energy. Further embodiments of the invention may use the saved energy to create more steam. Further embodiments of the invention may be used with any device that is configured to produce steam.

BRIEF DESCRIPTION OF THE DRAWINGS

[00011] Embodiments of the present invention will be more readily understood from the following detailed description when read in conjunction with the accompanying drawings, in which:

[00012] Figure 1 depicts an exemplary front schematic view illustrating an exemplary steamer according to an embodiment of the invention;

[00013] Figure 2 depicts an exemplary exploded front schematic view of the exemplary steamer of Fig. 1;

[00014] Figure 3 depicts an exemplary top view of a second steam chamber of the exemplary steamer of Fig. 1;

[00015] Figures 4-6, collectively, depict the exemplary steamer of Fig. 1 including an exemplary mechanical valve knob in different exemplary functional positions;

[00016] Figures 7 and 8, collectively, depict an exemplary rear schematic view of an exemplary steamer including an exemplary circuit, which may control an operating speed of an exemplary pump according to an embodiment of the invention;

[00017] Figures 9 and 10, collectively, depict a schematic rear partial view of an exemplary steamer including an exemplary mechanical valve for direct water flow control according to an embodiment of the invention; and

[00018] Figures 11 and 12, collectively, depict a schematic exemplary rear partial view of a steamer including an exemplary mechanical valve for indirect water flow control according to an exemplary embodiment of the invention.

DETAILED DESCRIPTION OF VARIOUS EXEMPLARY EMBODIMENTS

[00019] Various exemplary embodiments of the invention are discussed in detail below, including a preferred embodiment. While specific exemplary embodiments are discussed, it should be understood that this is done for illustration purposes only. A person skilled in the relevant art will recognize that other components and configurations may be used without parting from the spirit and scope of the invention.

[00020] According to an exemplary embodiment of the present invention, a steamer may include at least two steam generation chambers. Each steam generation chamber may have a different configuration for producing steam. The configurations cause steam to have different properties. The differences between the steams produced may include differences in the steam temperature, the output velocity of the steam, and/or the humidity level of the steam. For example, a first steam chamber may create large quantities of low temperature and low velocity steam output, whereas a second steam chamber may create high temperature and high velocity steam output. The first steam chamber may generate the low velocity steam by utilizing a large outlet orifice for producing high volume steam output at low pressure conditions. In contrast, the second steam chamber may generate high velocity steam by utilizing a small outlet orifice for reducing the steam flow at higher pressure conditions. The steamer may combine the different steams to generate a hybrid steam. A variety of steamer attachments may use the steam for a variety of uses including, e.g., but not limited to, garment steamer attachments, steam iron attachments, food steamer attachments, and/or steam cleaner attachments etc.

[00021] Figure 1 shows an exemplary embodiment of a steamer according to the invention. The steamer 100 may include a first steam chamber 1 and a second steam chamber 2. The first steam chamber 1 may be filled with a fluid such as, for example, but not limited to, water through an inlet 3. Other fluids may also be used to enhance the properties of the steam to be produced, such as, for example, but not limited to, salt water, lemon water, or water with bleach etc. The first steam chamber 1 may have an optimum predetermined fluid level to indicate an optimum maximum level of fluid intake for the steamer 100. The first steam chamber 1 may also include a warning predetermined minimum fluid level to indicate a dangerously low level of fluid in the

steamer 100. A sensor (not shown) may indicate the predetermined fluid level and the warning predetermined minimum fluid level. The first steam chamber 1 may be fluidly connected to the second steam chamber 2 through a series of passages.

[00022] The first steam chamber 1 may contain a base 4. The base 4 may include a heating element 5 (see Fig. 2) which may be embedded within the base 4. The heating element 5 may heat the fluid contained in the first steam chamber 1. As the fluid in the first steam chamber 1 increases in temperature, a steam (A) may develop from the heated fluid. The steam (A) may be characterized as a "moist steam" which has a temperature below a predetermined degree and a humidity level above a predetermined humidity level. The steam (A) may pass through a steam surface slowly to allow the humidity and heat to transfer to the steam surface over time. Garment steaming of linens, denims, and heavy cottons are examples where low velocity, low temperature, higher humidity steam may be used. The steam (A) can exit the first steam chamber 1 through an outlet pipe 6. The first steam chamber 1 may also include a thermostat 12 to measure the temperature of the fluid in the first steam chamber 1. The heating element 5 may be connected to a power supply (not shown) for continuous heating of the fluid.

[00023] The first steam chamber 1 may be fluidly coupled to the second steam chamber 2 through passages. When the fluid in the first steam chamber 1 reaches a predetermined temperature as determined by the thermostat 12, the fluid may exit the first steam chamber 1 through an exit pipe 13. A pump 14 may be coupled to the exit pipe 13 to pump the fluid from the first steam chamber 1. The thermostat 12 may ensure that the pump 14 pumps only when the fluid in the first steam chamber 1 reaches the predetermined temperature. For example, the predetermined temperature may be within a range of, e.g., but not limited to approximately 70 to 90 degrees

Celsius. The thermostat 12 may include an indicator light (not shown) to indicate when the fluid reaches the predetermined temperature. A pressure switch (not shown) may also be provided for reducing the pressure in the first steam chamber 1 and for further monitoring of the conditions in the first steam chamber 1. In an alternate embodiment, the second steam chamber 2 may have a separate device to channel fluid to the second steam chamber 2 in addition to the fluid from first steam chamber 1 or in place of the fluid from the first steam chamber 1.

[00024] The pump 14 may pump the fluid through the exit pipe 13 toward an inlet 10 of the second steam chamber 2. The pump 14 may pressurize the fluid that arrives at the second steam chamber 2. The end of the exit pipe 13 or the beginning of the inlet 10 may be coupled to an atomizer 15. The atomizer may convert the fluid into a fine mist without drops of fluid incorporated into the fine mist. Due to the surface tension of fluids such as water, drops of water require more heat energy to evaporate in comparison to a fine mist of water. The conversion of the fluid into a fine mist increases the surface area of the fluid which subsequently reduces the heat energy required for evaporating the fluid. The heat energy saved by utilizing the atomizer may be used to produce more steam The atomizer may be embodied as a spray nozzle device that has a small opening. As the fluid is pumped through the atomizer at high pressure, such as, for example 2 bars or greater, the fluid velocity at the exit pipe 13 may also be high which may cause the fluid to split into a plurality of small droplets thus creating the fine mist.

[00025] The fine mist may then enter the second steam chamber 2 through the inlet 10. The atomizer 15 may limit the possibility of fluid exiting with steam generated in the second steam chamber 2. A second steam (B) may exit the second steam chamber 2 via the outlet pipe 16 and may enter the exemplary mechanical valve assembly 17.

The steam (B) may have properties different than steam (A). The steam (B) may be characterized as a "dry steam" which may have a temperature above a predetermined degree and a humidity below a predetermined humidity level. The exemplary mechanical valve assembly 17 may include in one exemplary embodiment a switch or valve 18 (or valves) and may control the steam output of steam (A) and/or steam (B).

[00026] As depicted in Figure 2, the base 4 may include the heating element 5 and the second steam chamber 2, which may be defined by a top part or element 7, and a bottom part or element 8. A fastening system such as, e.g., but not limited to, a screw assembly 9 may couple the top and bottom parts 7, 8 together. The heating element 5 may heat the top part 7 to warm the fluid in the first steam chamber 1 and may also heat the contents in the second steam chamber 2. In an alternate embodiment, a second heating element 26 may be provided for heating the first steam chamber 1 or the second steam chamber 2.

[00027] As depicted in Figure 3, the second steam chamber 2 may be defined by corresponding channels formed in the top and bottom parts 7, 8 of the base 4. Alternatively, the channels may be positioned in a middle part (not shown) with the top part 7 and the bottom part 8 serving as covers. The path of the heating element 5 may track the channels formed in the top and bottom parts 7, 8. In this way, the heating element 5 may heat the contents of the second steam chamber 2 while heating the fluid in the first steam chamber 1. In one embodiment, the second steam chamber 2 may be designed to have the longest possible path available to provide the maximum length possible between inlet 10 and an outlet 11 for the conversion of all the fluid/mist into steam. In another embodiment, the second steam chamber 2 may have a shortened path to allow a smaller percentage of evaporation of the fluid. This

embodiment may allow a fine mist of fluid to exit with the steam created in the second steam chamber.

[00028] The exit pipe 13 may couple to the inlet 10 so that fluid from the first steam chamber 1 may enter or be injected to the second steam chamber 2 after passing through the atomizer 15. The atomized fluid that is injected into the second steam chamber 2 may be converted to steam by the end of the second steam chamber 2. The channel width of the second steam chamber 2 may be narrow or may narrow to facilitate the conversion of substantially all the fluid into steam.

[00029] The second steam chamber 2 may include sharp directional changes wherein the passage may turn with a small radius direction change. At these points, the second steam chamber 2 may have capture pockets 21A, 21B, 21C, and 21D (collectively 21) where fluid can collect. The capture pockets 21 may purposely create turbulence points within the passage to trap any fluid droplets that may be transferred along with the steam moving at a high velocity. The fluid, which is heavier than the steam, may be unable to turn within the passage and may remain trapped in the capture pockets 21 without the possibility to move until the fluid is converted into steam (B). Once the fluid inside the pockets is converted into steam (B), the pressure inside the second steam chamber 2 may increase due to the fluid to steam conversion process. The steam (B) in the passage may travel toward the steam outlet 11. An outlet pipe 16 (see Figs. 1 and 4) may connect or couple to the steam outlet 11 to channel the steam (B) away from the second steam chamber 2.

[00030] In the embodiment shown in Fig. 4, the outlet pipe 6 from the first steam chamber 1 and the outlet pipe 16 from the second steam chamber 2 may both be coupled to an exemplary mechanical valve(s) assembly 17. The mechanical valve assembly 17 may allow the release of steam (A) or steam (B). The mechanical valve

assembly 17 may also allow the steam (A) and the steam (B) to mix in order to form a hybrid steam (C). Steam cleaning is an example of using a high velocity moist steam. Thus, for steam cleaning, the hybrid steam (C) may be used.

[00031] The mechanical valve assembly 17 may include in one embodiment a valve 18, a micro-switch 19, and/or a control cam 20. The steam (A), steam (B), or hybrid steam (C) may exit the mechanical valve assembly 17 through a common output conduit 22 which may be coupled to the mechanical valve assembly 17. An exemplary micro-switch 19 may control the power supply to the pump 14. When the micro-switch 19 is depressed, power may be sent to the pump 14. The pump 14 may channel the fluid at the predetermined temperature from the first steam chamber 1 to the second steam chamber 2. The control cam 20 may depress the micro-switch 19 to turn the power on for the pump 14.

[00032] The valve 18 may be manually or automatically controlled and may control the position of the control cam 20. The valve 18 also may control the steam passed from outlet pipes 6 and 16 to the common output conduit 22. The embodiment depicted in Figures 4-6 shows the valve 18 with three positions. However, the valve 18 may alternatively be embodied with a single or other positions. Figure 4 shows an exemplary first position of the valve 18. In the first position, the mechanical valve assembly 17 may accept steam (A) from the first steam chamber 1 and may output the steam (A) via the common output conduit 22. In the first position, the control cam 20 may not contact the micro-switch 19 and the pump 14 may be off.

[00033] In the second position (see Fig. 5), the valve 18 may shift to a second position and the control cam 20 may contact the micro-switch 19. In this second position, the power may be supplied to the pump 14 and fluid at the predetermined temperature may be channeled to the second steam chamber 2. The mechanical valve assembly 17

may accept both steam (A) and steam (B) into the assembly 17 to form the hybrid steam (C). The hybrid steam (C) may exit the common output conduit 22.

[00034] In the third position (see Fig. 6), the valve 18 may shift to a third position and the control cam 20 may contact the micro-switch 19. In this third position, the mechanical valve assembly 17 may accept the steam (B) from the second steam chamber 2 via outlet pipe 16 while outlet pipe 6 is closed. Since the steam (A) may not exit the first steam chamber 1 through the outlet pipe 6 in this position, the pressure in the first steam chamber 1 may increase. The pressure switch (not shown) may be used to reduce the pressure generated in the steam chamber 1. The common output conduit 22 may release the steam (B) in this third position.

[00035] In an alternative embodiment, the valve 18 may have two positions. A first position may allow just one of the steam (A) or steam (B) to exit. In a second position, both the steam released in the first position and the steam not released in the first position may both be released. Accordingly, the steam released in the first position may always be released regardless of the first or second position. The steam output may be controlled in a range from of a predetermined minimum single release of steam to a maximum hybrid steam (C) of both steam (A) and steam (B).

[00036] In alternate embodiments of the invention, the mechanical valve assembly 17 may control a percentage of the steam (A) to enter the common output conduit 22 and control a percentage of the steam (B) to enter the conduit 22. For example, the hybrid steam (C) may comprise, e.g., but not limited to, 60% steam (A) and 40% steam (B) etc. Depending on user preference, the hybrid steam (C) may vary the amounts of steam (A) and steam (B) for the desired use.

[00037] Figures 7 and 8 depict another embodiment of the steamer in which the mechanical valve assembly 17 may not be included. In this embodiment, an electronic

control device 23 may be provided to control the operation and operating speed of the pump 14. The electronic control device 23 may include a control mechanism such as, for example, but not limited to, a control knob 24. The control knob 24 may have at least two positions to turn the pump 14 on and off. When the control knob 24 is shifted to an exemplary first position (see Fig. 7), the electronic control device 23 may send a control signal 25 to the pump 14 which may allow power to the pump 14 whereby fluid may be pumped from the first steam chamber 1 to the second steam chamber 2. When the control knob 24 is shifted to an exemplary second position (see Fig. 8), the electronic control device 23 may not send a control signal 25 to the pump 14 and the pump 14 may be off.

[00038] The control knob 24 may have a plurality of intermediate positions between the first position and the second position. The plurality of intermediate positions may control the strength of the control signal 25 and, consequently, the operating speed of the pump 14 and the amount of fluid at the predetermined temperature which may be pumped to the secondary steam chamber 2. In this embodiment, the steam (A) from the first steam chamber 1 may always be present in the output. The steam (B) from the secondary steam chamber 2 may be controllably introduced into the steam flow to form the hybrid steam (C). In this embodiment, the steam output may be controlled ranging from a minimum output to a maximum output. In the minimum output, only steam (A) may exit the steamer. In the maximum output, both steam (A) and steam (B) may be generated and mixed to form the hybrid steam (C) output from the steamer.

[00039] Figures 9 and 10 depict another embodiment of the invention. In this embodiment, an exit pipe 13' may be provided to fluidly couple or connect the first and the second steam chambers 1, 2. The exit pipe 13' may include a valve 27 to

allow and disallow the fluid to enter the second steam chamber 2. The valve 27 may range from disallowing the fluid to enter the second steam chamber 2 all together, to allowing a minimum portion of the fluid through, to allowing a maximum portion of fluid to enter through the exit pipe 13'. Accordingly, the fluid flow may change proportionally to the position of the valve 27. The electronic control device 23 may be used in conjunction with the exit pipe 13' and value 27 or separately. In an alternate embodiment, a direct control circuit or an indirect control circuit may also be used to control the steam (B) from exiting the secondary steam chamber 2 as discussed below.

[00040] The mechanical valve assembly 17 described in conjunction with the embodiments depicted in Figs. 4-6 may or may not be used with the embodiment described above and/or depicted in Figures 9 and 10. When the mechanical valve assembly 17 is not used, the outlet pipes 16 and 6 may be, e.g., but not limited to, connected directly or indirectly to the common output conduit 22. The end of the common output conduit 22 may be configured to allow a plurality of application-specific attachments to attach to the end.

[00041] In another embodiment of the invention (not shown), the common output conduit 22 may be configured to create a Venturi chamber. The Venturi chamber may use the output velocity of steam (B) from outlet pipe 16 to create a low pressure state for the steam (A) entering the common output conduit 22 from outlet pipe 6, or vice versa. The introduction of the high velocity steam (B) in the common output conduit 22 may increase the flow of steam (A) from the first steam chamber 1 due to the pressure state. In an exemplary embodiment, steam may move from a high pressure area to a low pressure area. In another exemplary embodiment, the steam may move with a velocity which may be changed in proportion to the relative pressures.

[00042] In another embodiment of the invention depicted in Figs. 11 and 12, an indirect return control circuit 28 may be provided. The return control circuit 28 may include a return valve 29 and a fluid return pipe 30. The return valve 29 may have a range of positions to control the amount of fluid to enter the return pipe 30 and to control the amount of fluid to continue toward the secondary steam chamber 2. As the fluid is pumped from the pump 14, the fluid may be channeled back to a pump inlet side of pump 14 via the fluid return pipe 30. The return valve 29 may control whether the fluid continues to the secondary steam chamber 2 or is returned to the pump inlet side via the fluid return pipe 30. The valve 29 may also proportionally control a certain amount of fluid to continue towards the secondary steam chamber 2 while reverting an amount back to the inlet side of the pump 14 via the fluid return pipe 30. As the valve 29 allows more fluid to continue to the secondary steam chamber 2, the fluid may flow more slowly toward the chamber 2 due to the decrease in pressure.

[00043] The valve 29 may allow no fluid transfer between the first steam chamber 1 and the second steam chamber 2. The return pipe 30 may enable the fluid pumped from the first steam chamber 1 to circulate even if there is no fluid transfer between the first steam chamber 1 and the second steam chamber 2. The return pipe 30 may prevent the pump 14, which is running continuously, from working without any fluid flow through the pump 14. If, for example, there is a blockage in the first steam chamber 1, fluid may be able to circulate through the return control circuit 28 and the pump 14 may not be affected. The indirect return control circuit 28 may offer more precise control in comparison with the exit pipe 13' having valve 27 shown in Figures 9 and 10. The indirect return control circuit 28 may be easier for maintaining the tolerances of the system. Due to the pressure conditions relieved by the circuit 28, the

return pipe 30 causes smaller changes in the first steam chamber 1 and the main flow of fluid through the pump 14 to the second steam chamber 2.

[00044] According to another exemplary embodiment, an output control mechanism such as, for example, a knob 31 or an attachment 32 may be provided to vary the amounts of steam (A), (B), or (C) to exit the common output conduit 22, The attachment 32 may control the mechanical valve assembly 17, the electronic control device 23, the valve 29, or control the valve 27 (see Figures 1, 8 and 9). The attachment 32 may be coupled to the output conduit 22 and may include a control device 33 to trigger the control of the mechanical valve assembly 17, the electronic control device 23, the valve 29, or control the valve 27. The control device 33 may have, e.g., but not limited to, a plurality of positions to signify (i) a predetermined minimum output of steam, (ii) a predetermined medium output of steam, and (iii) a predetermined maximum output of steam. An indicator light may indicate that the steam output may be increased by engaging the control device 32.

[00045] The attachment 32 may be use-specific. Examples include, but are not limited to, attaching a hose to the conduit 22 to use the steamer as a garment steamer, attaching an iron apparatus to the conduit 22, attaching a food apparatus to the conduit 22 to steam food, and/or attaching a cleaning device to the conduit 22 to use the steam to disinfect surfaces.

[00046] While various exemplary embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should instead be defined only in accordance with the following claims and their equivalents.

WHAT IS CLAIMED IS:

1. A steam apparatus, comprising:

a first steam apparatus to produce a first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature;

a second steam apparatus to produce a second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature; and

an output apparatus configured to receive the first steam and the second steam and output the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam.

2. An apparatus, comprising:

a first steam chamber configured to contain fluid;

a second steam chamber disposed adjacent to the first steam chamber and fluidly coupled to the first steam chamber, wherein the second steam chamber defines a passage configured to receive fluid from the first steam chamber;

at least one heating element disposed within the second steam chamber and substantially adjacent to the passage, wherein the at least one heating element is configured to heat the fluid in the first steam chamber to generate a first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature, and wherein the at least one heating element is

configured to heat the fluid received in the passage to generate a second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature; and

at least one common output conduit fluidly coupled to an exit of the passage and fluidly coupled to the first steam chamber, wherein the common output conduit is configured to receive the first steam and the second steam and output the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam.

3. The apparatus according to claim 2, further comprising:

a first pipe extending from the first steam chamber to channel the fluid to an inlet of the passage of the second steam chamber;

a pump coupled to the first pipe to pump the fluid from the first steam chamber to the inlet of the passage;

a second pipe extending from an outlet of the passage to the at least one common output conduit; and

a third pipe to channel the first steam evaporated from the fluid in the first steam chamber, wherein the third pipe extends from the first steam chamber to the at least one common output conduit.

4. The apparatus according to claim 3, further comprising:

a mechanical valve assembly coupled to the second pipe and the third pipe and located before the at least one common output

conduit, wherein the mechanical valve assembly releases at least one of the first steam, the second steam, or the hybrid steam into the at least one common output conduit.

5. The apparatus according to claim 4, wherein the mechanical valve assembly comprises a valve mechanism, a cam coupled to the valve mechanism, and a micro-switch configured to be engaged by the cam, wherein the valve mechanism is positionable in at least a first position, a second position, and a third position, wherein in the first position the cam does not contact the micro-switch and the pump is off, wherein in the second and third positions the cam contacts the micro-switch and the pump is on.

6. The apparatus according to claim 5, wherein the mechanical valve assembly allows passage of the first steam in the first position, the hybrid steam in the second position, and the second steam in the third position.

7. The apparatus according to claim 3, further comprising an electronic control device to control an operational speed of the pump by sending a control signal to the pump.

8. The apparatus according to claim 3, wherein the at least one common output conduit comprises a venturi chamber, wherein the second steam enters the at least one common output conduit at a velocity above a predetermined velocity which lowers a pressure in the third pipe and increases a flow of the first steam into the at least one

common output conduit.

9. The apparatus according to claim 3, further comprising a fluid control valve assembly coupled to the first pipe and located between the pump and the inlet to the passage, wherein the fluid control valve assembly is configured to control an amount of fluid to enter into the passage.

10. The apparatus according to claim 3, further comprising a fourth pipe with a first end and a second end, wherein the first end is coupled to the first pipe before the pump and the second end is coupled to the first pipe after the pump, wherein the fourth pipe comprises a valve to allow the fluid to be diverted away from the passage and to minimize an amount of fluid to enter the passage.

11. The apparatus according to claim 3, further comprising a thermostat coupled to the first steam chamber to measure the temperature of the fluid in the first steam chamber, an indicator light coupled to the first steam chamber and coupled to the thermostat, wherein the light turns on when the fluid in the first steam chamber reaches a predetermined temperature.

12. The apparatus according to claim 11, wherein the predetermined temperature is between 70 and 90 degrees Celsius.

13. An apparatus according to claim 2, further comprising:

a second heating element disposed within the first steam chamber, wherein the second heating element is configured to heat the fluid in the first steam chamber to generate the first steam.

14. The apparatus according to claim 2, wherein the apparatus comprises at least one of a garment steamer, a food steamer, a steam iron, or a steam cleaner.

15. The apparatus according to claim 2, further comprising an atomizer disposed to an inlet of the passage, wherein the atomizer converts the fluid into a mist at the inlet of the passage defined by the second steam chamber.

16. The apparatus according to claim 2, further comprising a device coupled to the at least one common output conduit, wherein the device controls the exiting of the first steam, the second steam, or the hybrid steam.

17. The apparatus according to claim 2, wherein said first predetermined level is the same as the second predetermined level.

18. The apparatus according to claim 2, wherein said first predetermined temperature is the same as the second predetermined temperature.

19. A method for generating steam, the method comprising:

heating fluid in a first steam chamber with at least one heating element to generate a first steam from evaporation of the fluid;

channeling the first steam to a common output conduit;

pumping the fluid from the first steam chamber to a passage in a second steam chamber;

heating the fluid in the passage with the at least one heating element;

channeling the fluid through the passage to generate a second steam;

channeling the second steam to the at least one common output conduit; and

outputting the first steam, the second steam, or a hybrid steam from the at least one common output conduit.

20. The method according to claim 19, further comprising: controlling an amount of the second steam, an amount of the first stream, or an amount of hybrid steam to exit the at least one common output conduit.

21. The method according to claim 19, further comprising heating the fluid in the passage with a second heating element.

22. The method according to claim 19, further comprising controlling the amount of fluid to enter the passage.

23. The method according to claim 19, further comprising varying a speed of the pumping of the fluid from the first steam chamber to the passage in the second steam chamber.

24. The apparatus according to claim 19, further comprising applying the output to a garment, a surface-to-be-cleaned, or to a food.

25. An apparatus for generating steam, comprising:

means for containing fluid;

means for heating fluid in the containing means to generate first steam from evaporation of the fluid, the first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature;

means for generating second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature; and

means for outputting the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam.

26. The apparatus according to 25, wherein the apparatus comprises at least one of a garment steamer, a food steamer, a steam iron, or a steam cleaner.

27. A method for generating steam, the method comprising:

producing a first steam having a humidity level at or above a first predetermined level and having a temperature at or below a first predetermined temperature in a first steam apparatus;

producing a second steam having a humidity level at or below a second predetermined level and having a temperature at or above a second predetermined temperature in a second steam apparatus;

receiving the first steam and the second steam in an output apparatus; and

outputting the first steam, the second steam, or a hybrid steam defined by a mixture of the first steam and the second steam with the output apparatus.

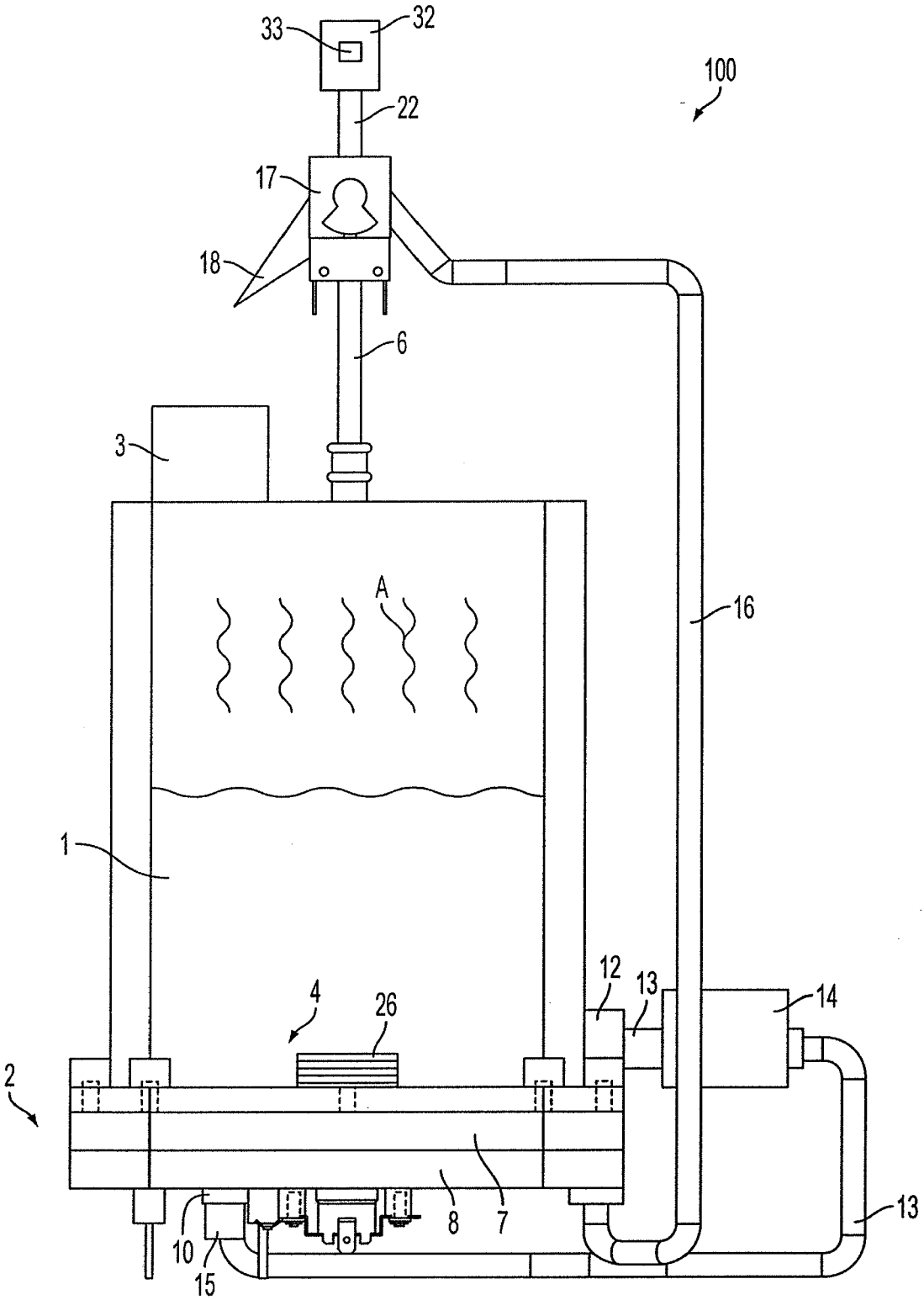

FIG. 1

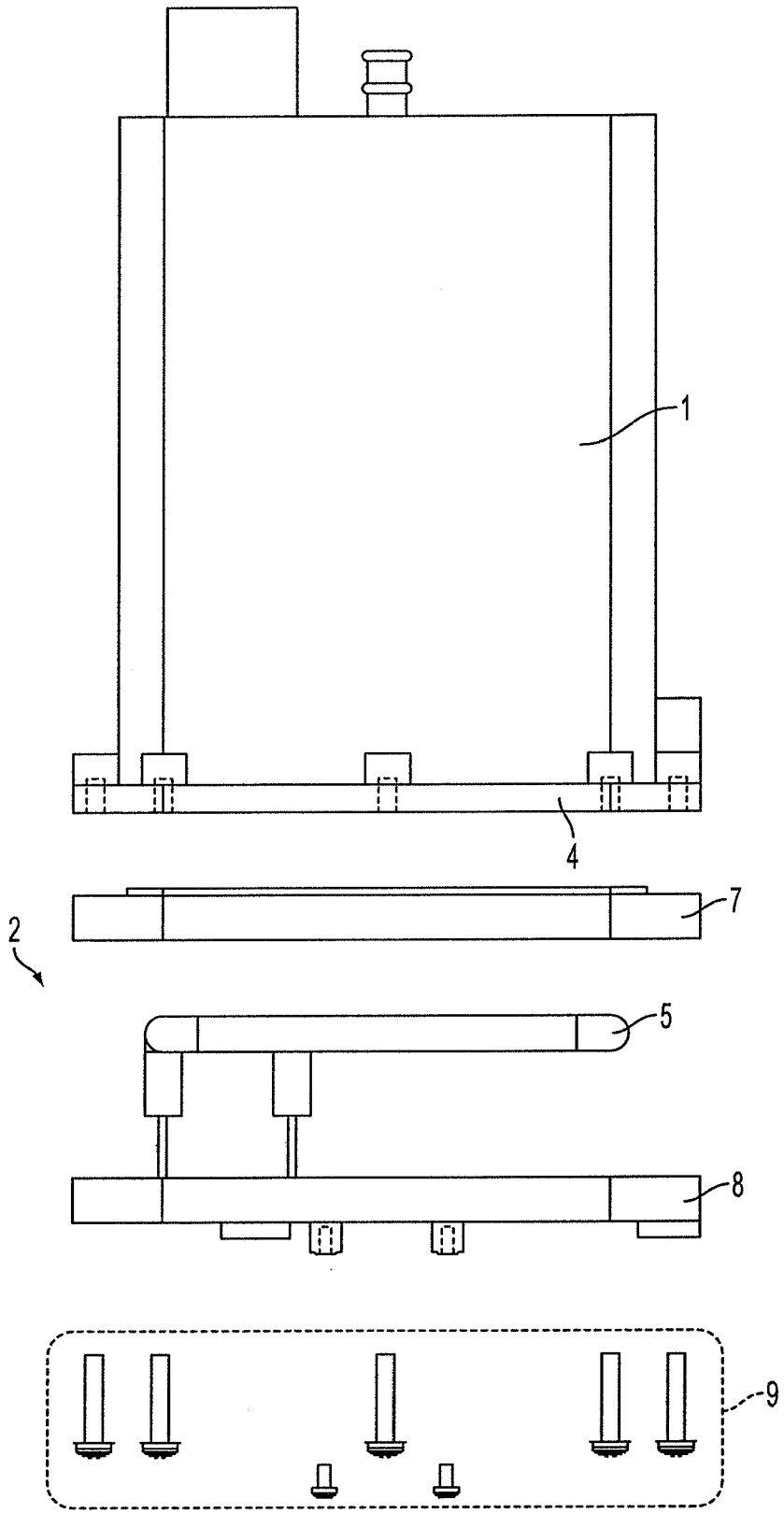

FIG. 2

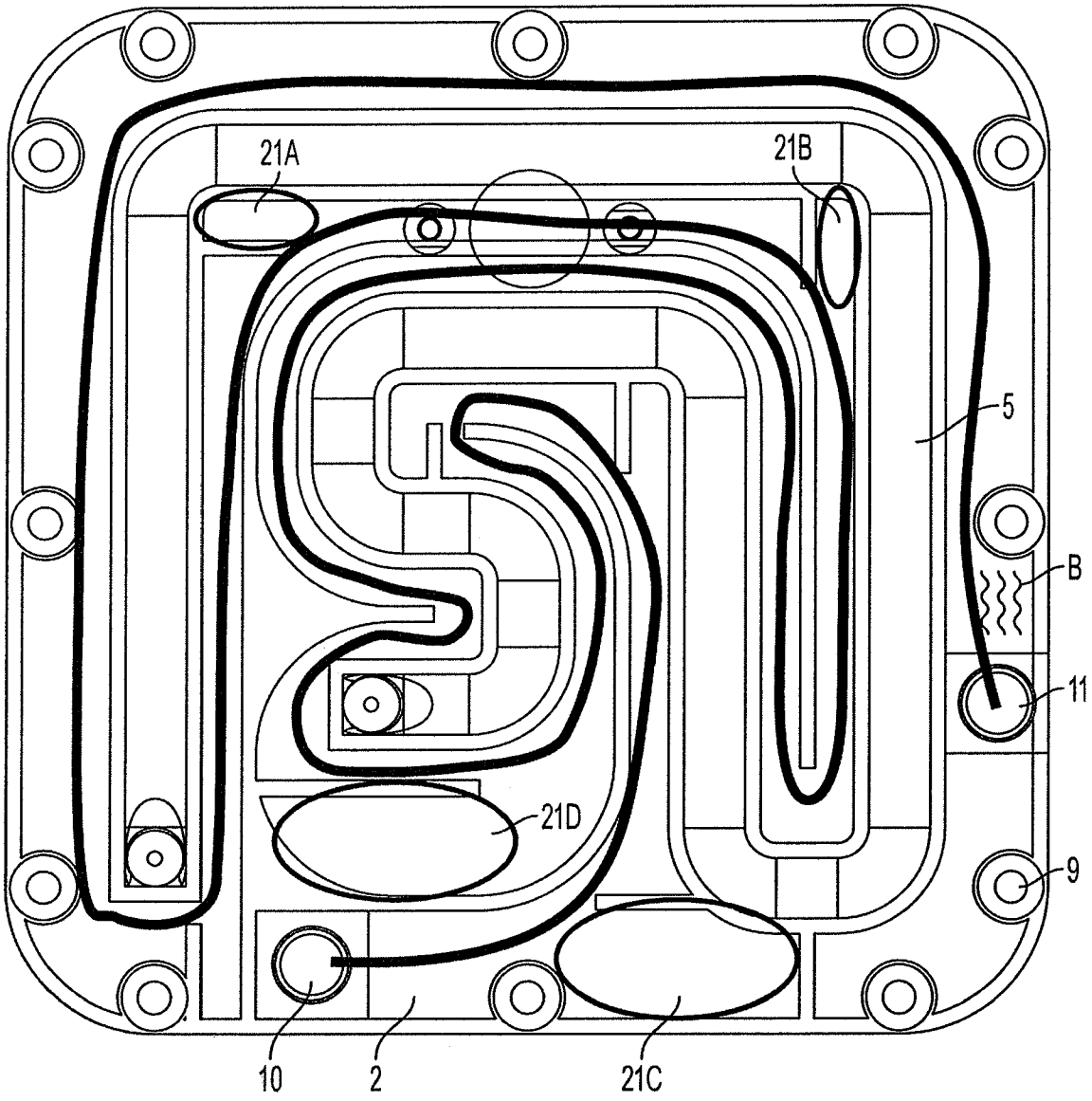

FIG. 3

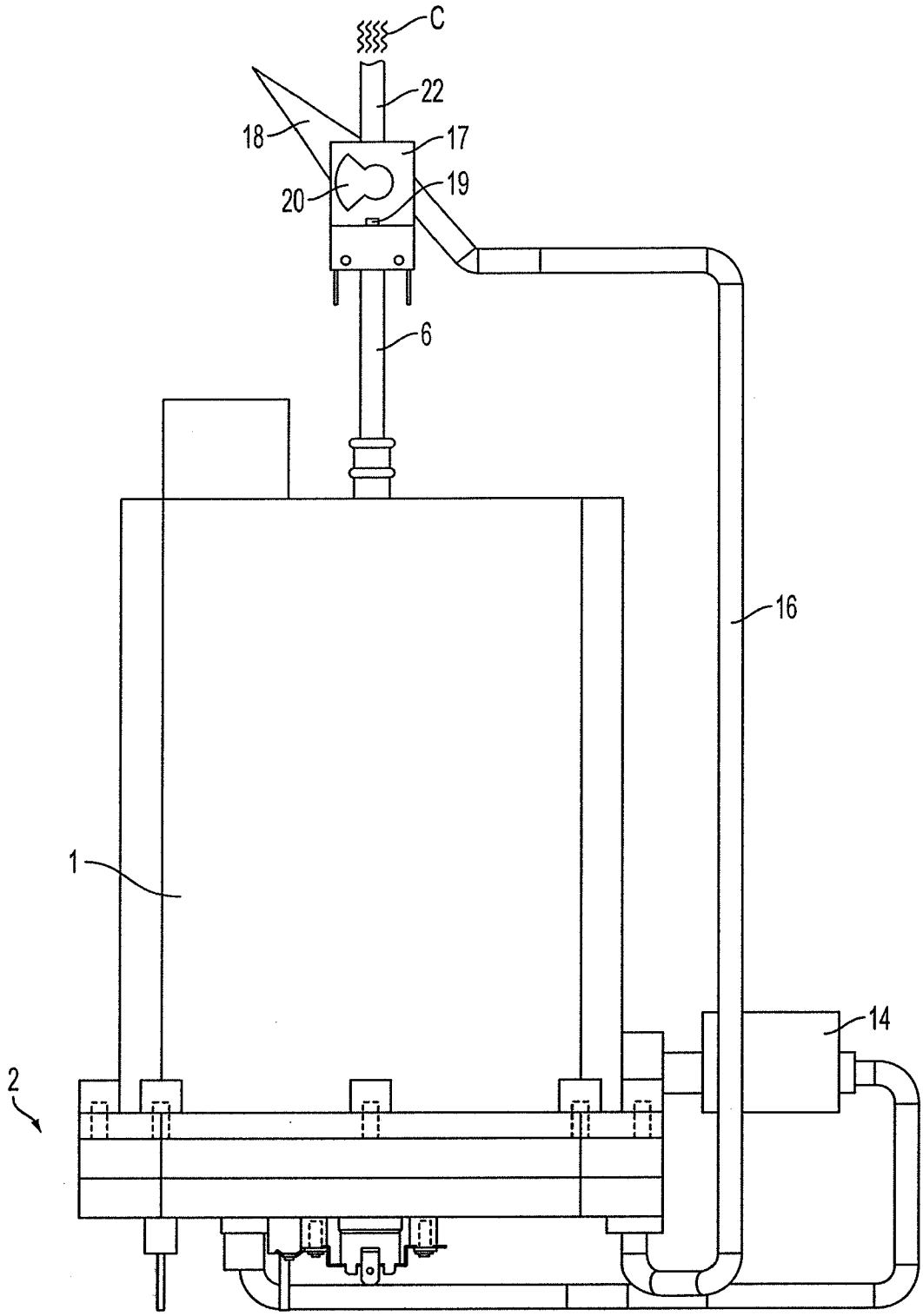

FIG. 4

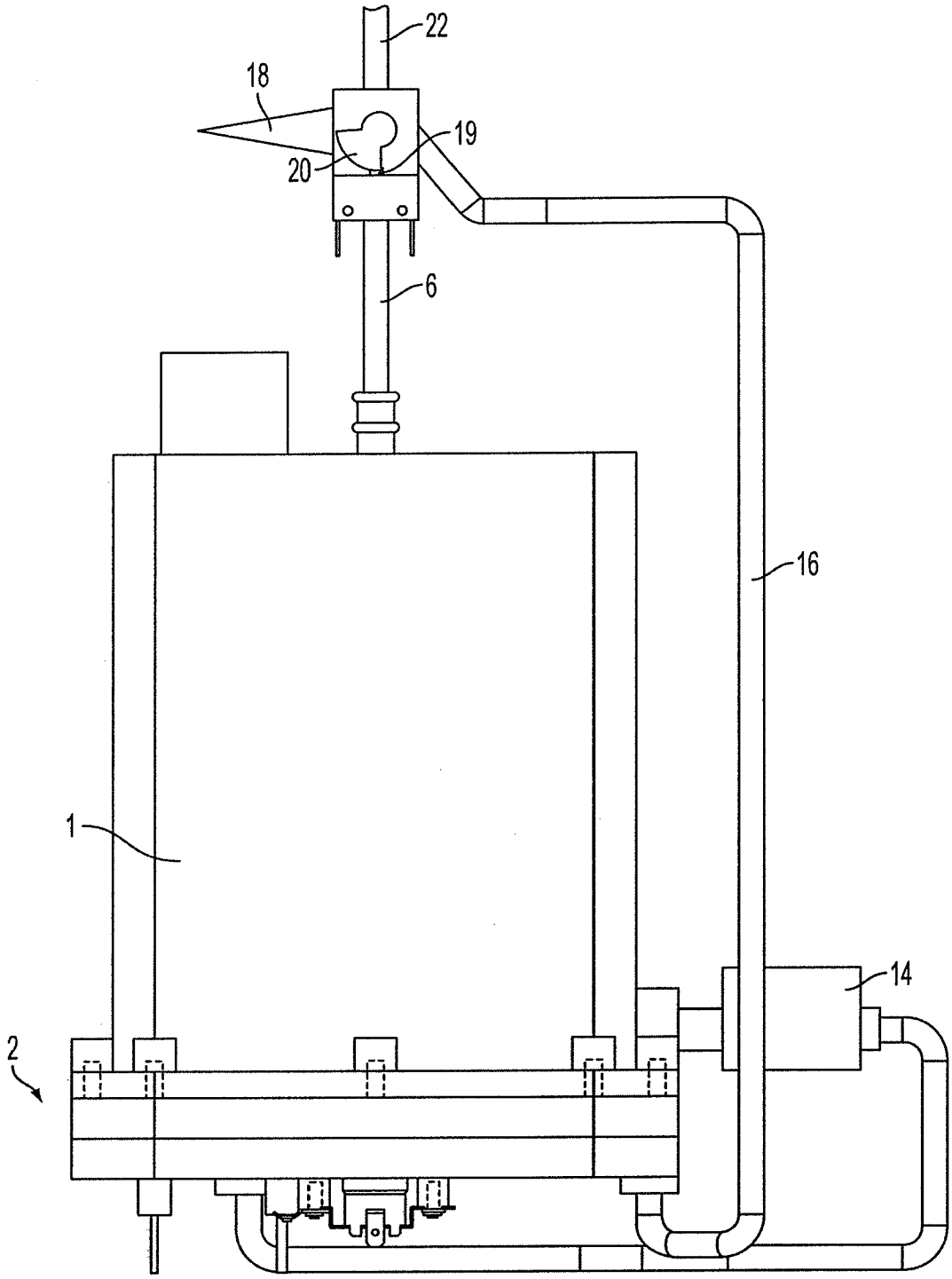

FIG. 5

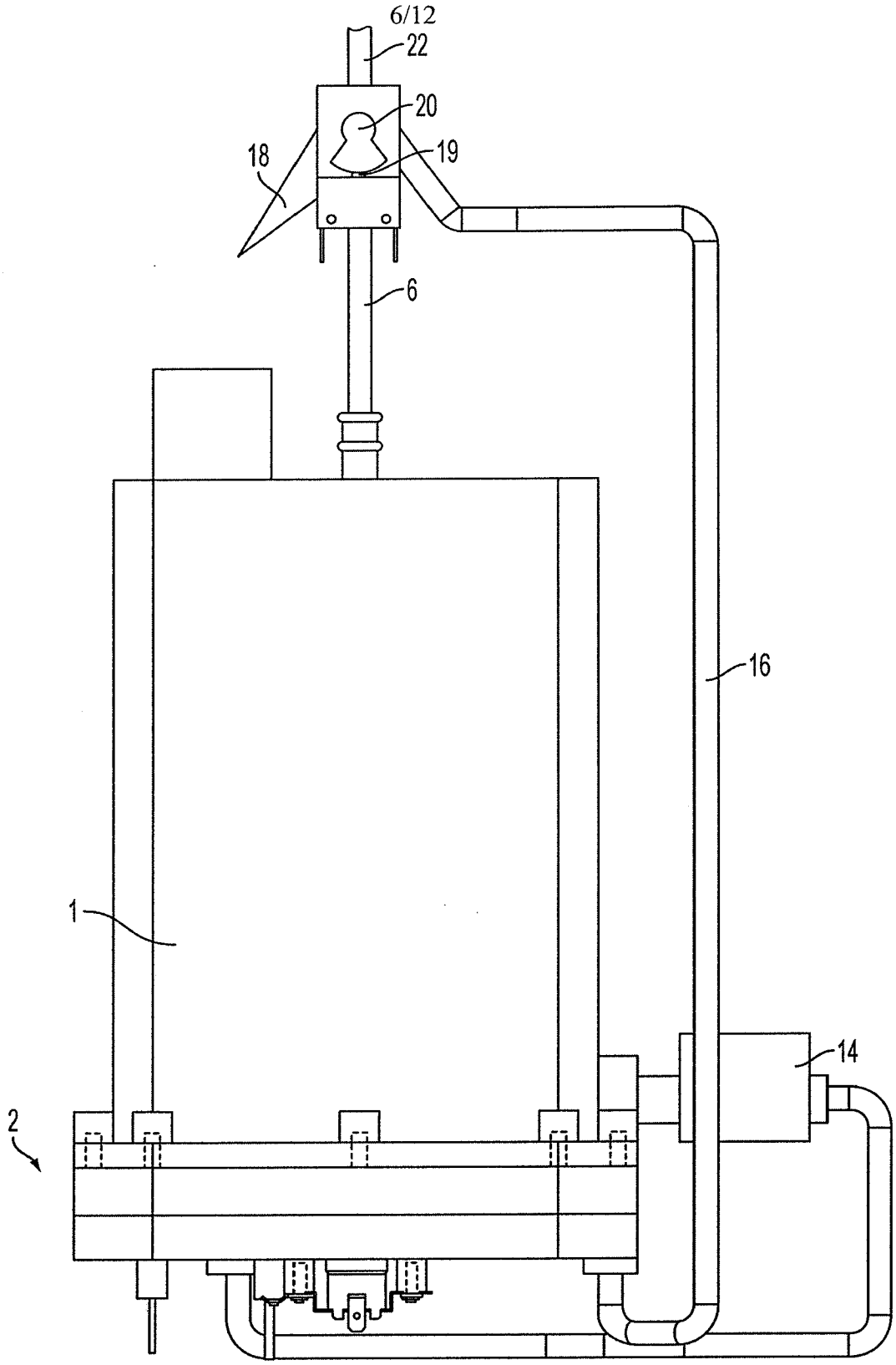

FIG. 6

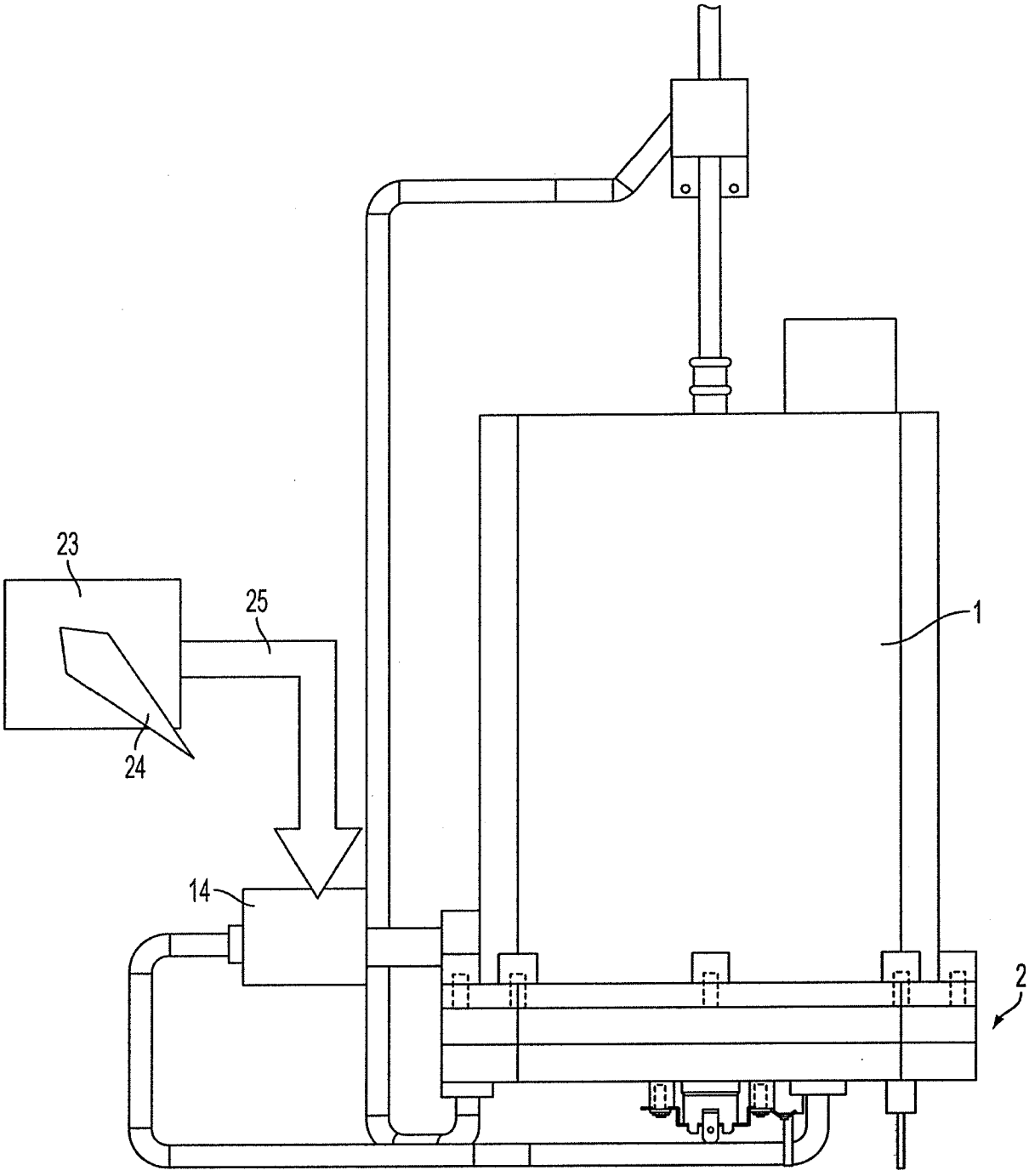

FIG. 7

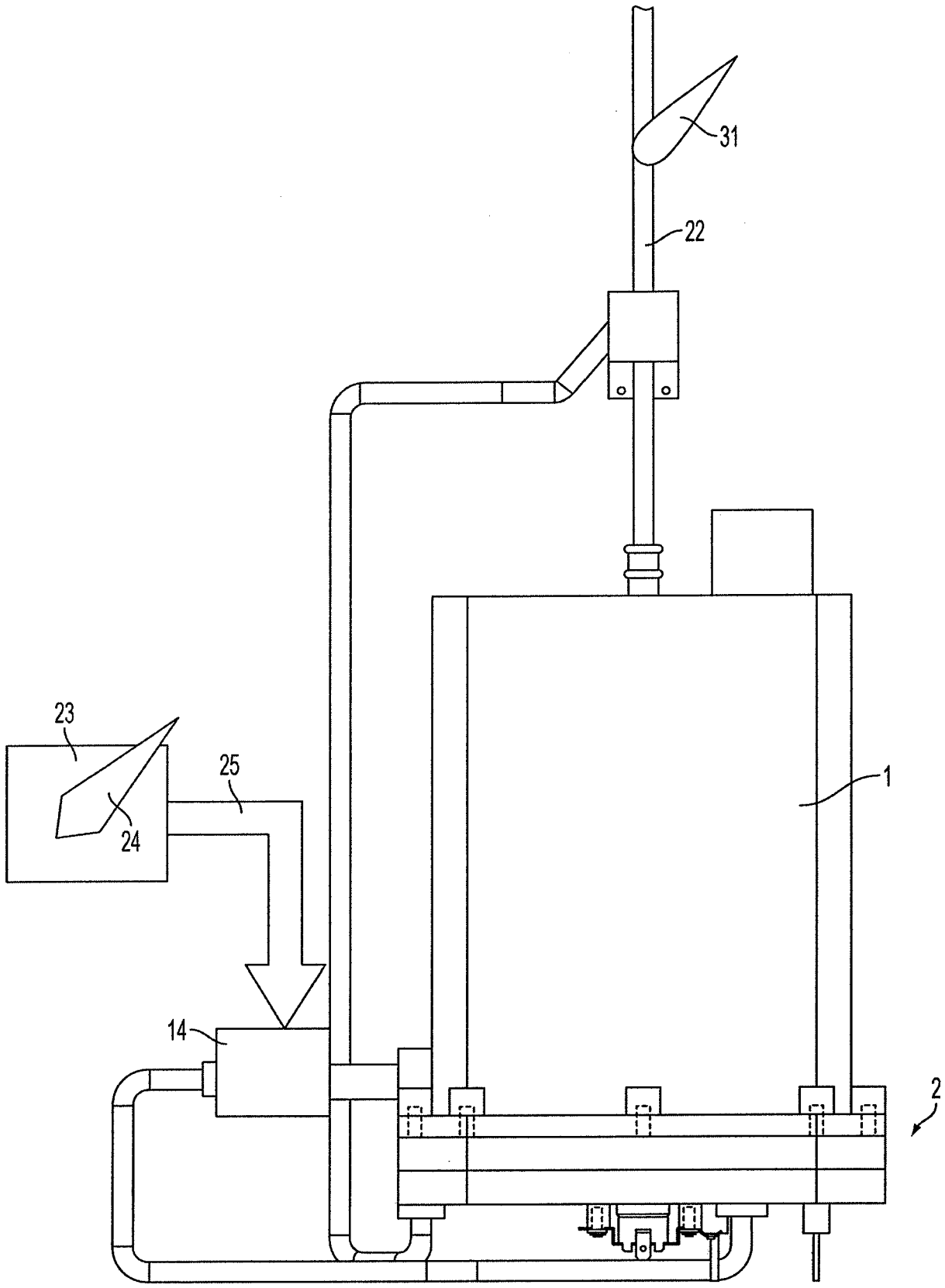

FIG. 8

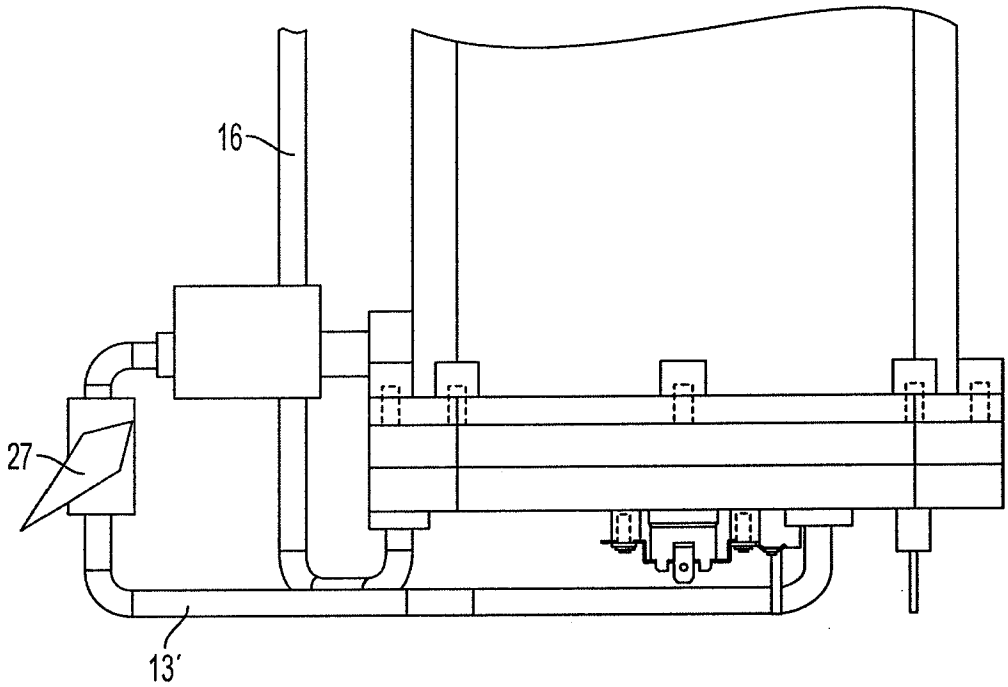

FIG. 9

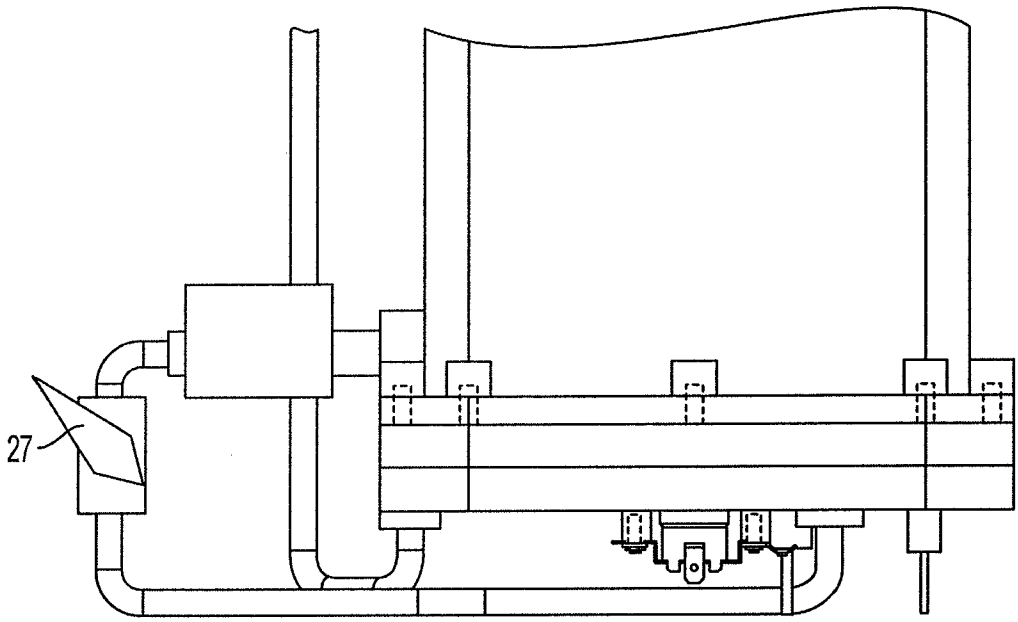

FIG. 10

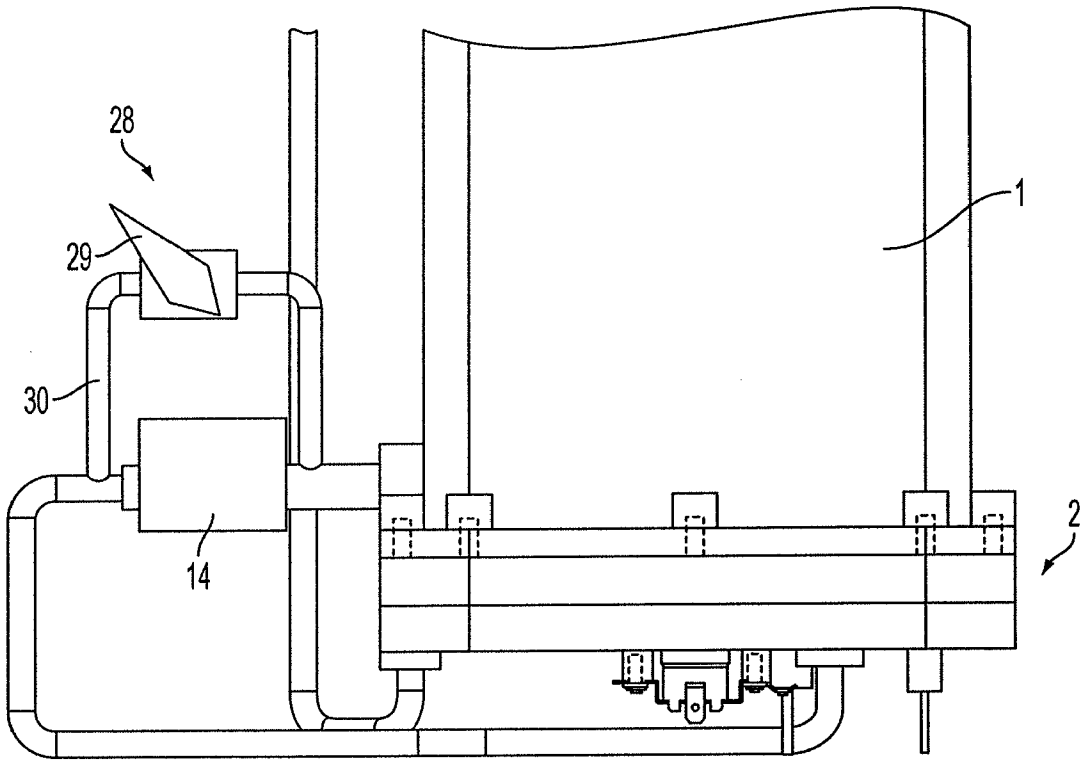

FIG. 11

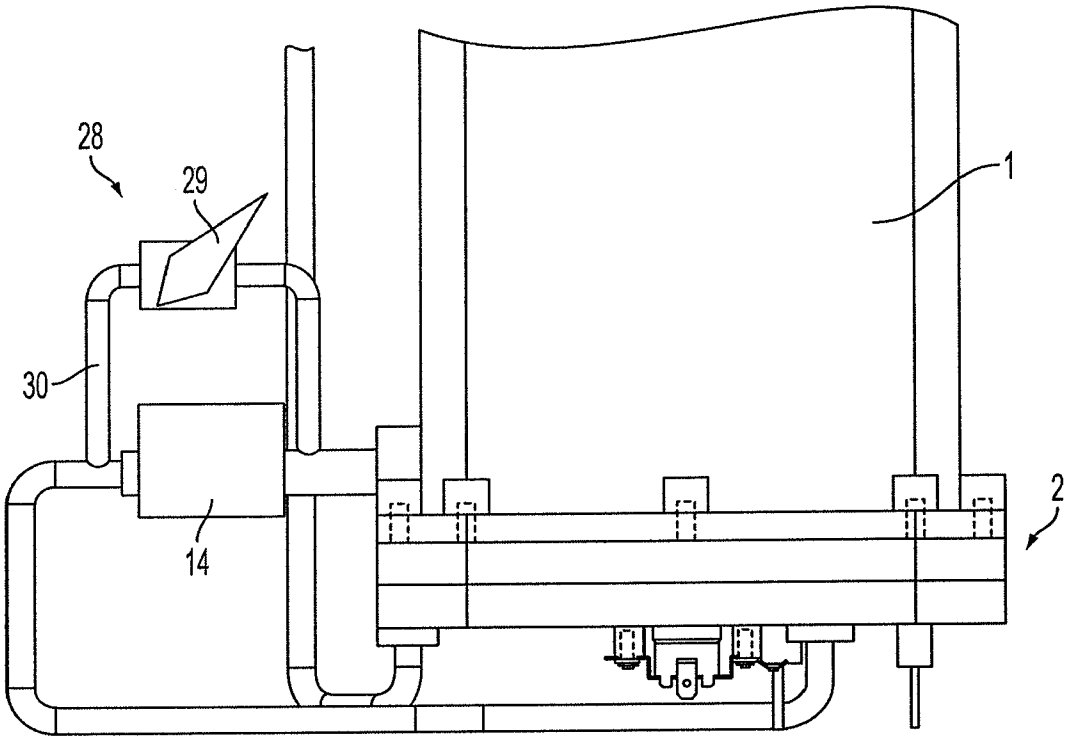

FIG. 12

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/057231

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F39/00 F22B1/28 A47L11/34 A47J27/04

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F F22B A47L F01K A47J

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 536 981 A (BRITISH BOILER ACCESSORIES LTD; WALTER GOLDSTREAM) 4 June 1941 (1941-06-04) page 1, line 55 - line 105; figure 1	1,25,27
X	US 1 498 662 A (FRANZ LÖSELX) 24 June 1924 (1924-06-24) page 3, lines 15-31; figure 3	1,25,27
X	FR 689 252 A (CHAUROBEL) 4 September 1930 (1930-09-04) page 2, lines 26-100; figure 2	1,25,27
A	GB 638 641 A (WILLIAM MICHAEL CISSELL) 14 June 1950 (1950-06-14) page 1, line 81 - page 2, line 127	1-5,14, 15,19,25

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 January 2010	08/02/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Kising, Axel

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/057231

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 942 230 A (C D S CLEANING & DISINFECTION [IT]) 15 September 1999 (1999-09-15) column 2, paragraph 19 - column 3, paragraph 16; figure 2	1,2,14, 19,25
A	US 3 823 497 A (SOLOMON A) 16 July 1974 (1974-07-16) column 5, line 7 - column 6, line 6; figures 1,5	1,2,19, 25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2009/057231

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 536981	A	04-06-1941	NONE		
US 1498662	A	24-06-1924	NONE		
FR 689252	A	04-09-1930	NONE		
GB 638641	A	14-06-1950	NONE		
EP 0942230	A	15-09-1999	IT	MI980521 A1	13-09-1999
US 3823497	A	16-07-1974	NONE		