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(54) FOAM ON BEER (FOB) DETECTOR

(57) A foam on beer (FOB) detector (300) is disclosed which comprises a chamber body (340), a fluid inlet (321), a fluid outlet (320), a fluid flow path passing from the inlet (321) to the outlet (320), and a flow path interrupter (360). The fluid inlet (321) is disposed at the first end (341) of the chamber body (340), and arranged so as to guide flow into the chamber body (340) in an axial direction, and the fluid outlet (320) is disposed at the second end (342) of the chamber body, and configured to guide flow out of the chamber body (340) in the axial direction.

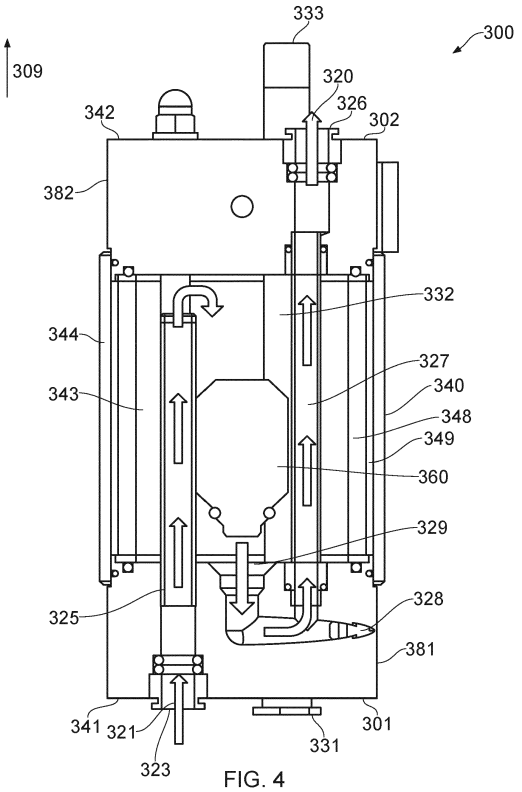

FIG. 4

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Description

Field of the invention

[0001] The present invention relates to a foam on beer ("FOB") detector. In particular, the present invention relates to a FOB detector configured to allow for easier installation and space saving in use.

Background

[0002] Beer dispensing systems are used in the commercial food and beverage industry to provide on-demand dispensing of beer. One known beer dispensing system includes a tap, a beer line, and a bulk container of beer which is known in the art as a keg. In this known beer dispensing system, a user becomes aware that the keg is almost empty when, upon moving the tap to an open position, beer foam is dispensed from the tap instead of beer. At this point, the keg will need to be replaced, the tap will need to be opened and the foam in the line will need to be replaced by beer before beer can then be dispensed from the tap instead of foam. Replacing foam in the beer line with beer can take time, and can result in beer being wasted.

[0003] Foam on beer ("FOB") detectors have been developed in the past to overcome this problem of replacing foam in the beer line. A FOB detector is inserted into the line between the keg and the tap in a further known beer dispensing system. The FOB detector acts as a valve to stop fluid passing from the keg to the tap when foam reaches the FOB detector. With a FOB detector installed in the system, the user becomes aware that the keg is almost empty when foam reaches the FOB, and the line does not fill with foam because the FOB detector closes the line and prevents further flow through the line until the operator has replaced the keg and re-set the FOB detector.

[0004] A drawback of both of these known beer dispensing systems is that all equipment in contact with the beer (e.g. beer lines; FOB detector) requires regular cleaning to prevent microbial growth and avoid contamination. Regular cleaning can take time and can result in the beer dispensing system being out of use for significant periods of time. This operation also takes up time and related human and chemical resources in the cleaning operation. There is therefore a need for improvement in beverage dispensing systems.

[0005] A further known FOB detector is described in the inventor's own earlier patent application GB2565299, which describes a cooled FOB detector which addresses the problem of microbial growth.

[0006] However, the inventor has identified the opportunity for further improvement in such beverage dispensing systems.

Summary of the Invention

[0007] According to a first aspect of the invention, there is provided a foam detection device for a beverage dispensing system comprising:

a chamber body having a first end and a second end, and a cavity disposed between the first and second ends;
a fluid inlet, a fluid outlet, and a fluid flow path passing from the fluid inlet, into and through the cavity, and out of the fluid outlet;
a flow path interrupter disposed in the fluid flow path within the chamber and configured to interrupt the flow path from the fluid inlet to the fluid outlet of the chamber upon detection of foam in the chamber;
wherein the fluid inlet is disposed at the first end of the chamber body, and is arranged so as to guide flow into the chamber body in an axial direction,
and wherein the fluid outlet is disposed at the second end of the chamber body, and is configured to guide flow out of the chamber body in the axial direction.
This has the advantage of providing a foam detection device which is easier to install, as will be explained further in relation to the figures.

[0008] The foam detection device may be configured or operable such that the fluid flow path exits the cavity at the first end, and turns back on itself to flow back towards the cavity at the first end.

[0009] The fluid flow path when exiting the cavity may be substantially or wholly parallel to the fluid flow path flowing back towards the cavity.

[0010] The foam detection device may be configured or operable such that the fluid flow path exits the cavity at the first end, and turns back on itself to guide flow back towards the cavity at the first end, and to guide flow back through the cavity.

[0011] The fluid flow path may define a U-shape at the first end.

[0012] The fluid flow path may enter the cavity at the first end, exit the cavity at the first end, and further exit the cavity at the second end. Preferably, the fluid flow path is configured for, or operable such that these steps to occur in the order described.

[0013] The fluid flow path may turns back on itself after exiting the cavity at the first end, to guide flow towards and then through the cavity, following which it may exit the cavity at the second end.

[0014] The foam detection device may be configured or operable such that the fluid flow path through the device substantially defines an S-shape.

[0015] The foam detection device may comprise at least one cooling fluid flow path. The at least one cooling fluid flow path may pass through the cavity between the first end and the second end.

[0016] The cooling fluid flow path may comprise a cooling inlet at the first end. The cooling fluid flow path may

comprise a cooling outlet at the second end. The cooling fluid flow path may pass through the chamber body in an axial direction.

[0017] The foam detection device may comprise at least two cooling fluid flow paths. Each cooling fluid flow path may pass through the chamber body between the first end and the second end.

[0018] The or each cooling fluid flow path may be defined by a cooling flow pipe. The or each cooling fluid flow path may be substantially straight.

[0019] The chamber body may comprise a first end wall at the first end, and/or a second end wall at the second end, and/or at least one side wall. The side wall may extend between the first and second end walls. The end walls and at least one side wall may define the cavity therebetween.

[0020] The cooling fluid flow path may have a lateral dimension, i.e. diameter, of less than an inch, preferably a half inch, or less. The cooling fluid flow path may have a lateral dimension of more than 1/5, preferably more than 1/4 the diameter of the chamber body.

[0021] The fluid flow path may have a lateral dimension of approximately 0.4, or 0.38, or 0.375 inches.

[0022] The foam detection device may be configured or operable such that in use, the first end is disposed below the second end.

[0023] The foam detection device may be provided as part of a beverage dispensing system, the system comprising:

a fluid source, the fluid source being configured or operable to contain a fluid to be dispensed;
a fluid dispensing line, the fluid dispensing line being connectable to the fluid source to allow fluid to leave the fluid source through the fluid dispensing line;
a fluid dispensing means, the fluid dispensing means being connectable to the fluid dispensing line and being operable to restrict or allow fluid to pass through the fluid dispensing means;
a foam detection device as described above, the foam detection device being arranged in the fluid dispensing line, such that fluid passing from the fluid source passes from the fluid inlet, to the fluid outlet, via the fluid flow path of the foam detection device before passing to the fluid dispensing means.

[0024] The beverage dispensing system may comprise a cooling system. The cooling system may comprise a cooling fluid flow path. The cooling fluid flow path may enter the cavity at the first end. The cooling fluid flow path may exit the cavity at the second end, turn back on itself and re-enter the cavity at the second end, and then exit the cavity at the first end.

[0025] According to a second aspect of the invention, there is provided a kit of parts for the foam detection device as described above, comprising at least:

a chamber body;
a fluid inlet, fluid outlet and flow path;
a flow interrupter;
the kit of parts being configured or operable such that, when assembled, the chamber body, fluid inlet, fluid outlet, flow path and flow interrupter provide the foam detection device as described before.

Brief Description of the Figures

[0026] Further details of specific embodiments will be apparent from the following detailed description of preferred embodiments, in which:

Figure 1 shows a prior art beer-dispensing system;
Figure 2 shows a FOB detector of the prior art system of figure 1;
Figure 3 shows a beer dispensing system comprising a FOB detector according to the present invention;
Figure 4 shows a beverage flow path through the FOB detector of figure 3;
Figure 5 shows a cooling fluid flow path through the FOB detectors of figures 3 and 4;
Figure 6 shows a cross-sectional view of the FOB detector of figures 3 to 5.

Detailed Description of Preferred Embodiments

[0027] Figure 1 shows a known beer dispensing system 1 comprising a known FOB detector 100. The known beer dispensing system 1 comprises a tap 110 for dispensing beer into a drinking vessel such as a glass. A tap 110 is commonly disposed at a delivery position such as on a bar 111. The tap 110 is fluidly connected to other parts of the beer dispensing system 1 via a fluid delivery line 120.

[0028] The fluid delivery line 120 of this known system, as shown in figure 1, comprises a first part 121, a second part 122 and a third part 123. The first part 121 is disposed between a keg 140 and a coolant means 170. The second part 122 is disposed between the coolant means 170 and a lower part of the FOB detector 100. The third part of the fluid line 123 is disposed between the FOB detector 100 and the tap 110. This enables fluid such as a beverage in particular beer, to flow from the keg 140, into the first part 121 of the fluid delivery line 120, into the coolant means 170, then into the second part 122 of the fluid delivery line 120, into the FOB detector 100, then into the third part 123 of the fluid delivery line 120, then to the tap 110. The known FOB detector 100 is equipped with a flow interruption means 160 which is configured to interrupt the flow of beer through the FOB detector 100 when the FOB detector 100 detects foam in the beverage flowing through it. This can be achieved using a float 160 configured to drop when the density of fluid in the FOB detector 100 is sufficiently reduced by the presence of bubbles or gas in the fluid. This dropping of the float 160 then blocks an exit chamber of the FOB detector 100 preventing further flow through the system, until the keg

140 is changed, and the FOB detector is refilled with liquid beverage without foam by an operator.

[0029] Actuation of this known FOB detector 100 may be best seen in figure 2, which shows the prior art FOB detector 100 of figure 1. As can be seen in figure 2, the beverage, such as beer, flows up and into the FOB detector from the second part of the fluid line 122, and then is caused by gravity to flow down through and then out of the FOB detector 100, at which point it enters the third part 123 of the fluid line 120 beneath the FOB detector 100. In this known FOB detector 100, there is also provided a coolant line 133. This coolant line 133 passes through the FOB detector 100 by passing from a lower end of the FOB detector 100, up into, and then down and out through the bottom of the FOB detector 100.

[0030] The known FOB detector 100 and fluid dispensing system 1 which are described above with reference to figures 1 and 2 correspond to the known embodiment described in published GB patent application GB2565299 ("GB'299"). The flow dispensing system in GB'299 is best seen in figure 2 of this document, in which the FOB detector 300 is shown between fluid lines 221 and 222. As can be seen from figures 2 and 3 of GB'299, the beverage flows into the FOB detector chamber 310 by means of an inlet which enters the FOB detector from a lower end. The beverage inlet is not shown in figure 3 of GB'299, however, as the description states, the beer flows into the FOB detector by a known fluid inlet (not shown) in figure 3, and flows out of the FOB detector through a fluid outlet 312. The inlet and outlet 312 of FOB detector 300 of GB'299 are both disposed at the lower, flow interrupting, end 332 of the FOB detector 300.

[0031] Although the known FOB detector is adequate for its intended purpose, the inventor of the present application has identified that various improvements can be made to the known FOB detector described in GB'299 and described above in relation to figures 1 and 2 of the present application.

[0032] One identified improvement to the known FOB detector is that it can be made easier to install. In the known FOB detector, pipes used to define the fluid inlet and fluid outlet of the FOB detector in practice are quite similar in appearance, meaning that at the point of installation by an operator, the inlet and outlet pipes (i.e. the second and third parts 122, 123 of the fluid line 120 in figure 1) could be confused with each other.

[0033] A second improvement to the known FOB detector is that the third part of the fluid line 123 from the FOB detector 100 would need to be bent back upwards towards the tap 110 when installed. In terms of practical installation this leaves several options open to the operator when installing the FOB detector, as the required flexibility of the third part 123 of the fluid line 120 provides several options for the location of the fluid line 120, i.e. whether it passes behind, in front of, or to the sides of the FOB detector 100. This in practice could complicate installation of the FOB detector 100.

[0034] The inventor has also identified a further improvement to the known system 1 and known FOB detector 300. In the known system 1, there is a cooling flow pipe 133 which can advantageously cool the beverage inside the FOB detector 100. However, the cooling flow pipe 133 can limit the movement of the float 160 within the FOB detector 100. This means that for any given required length of movement of the float 160, the FOB detector 100 has to be made longer to accommodate the cooling flow pipe 133 within the chamber above the float 160.

[0035] When making these improvements, the inventor created the device shown in figure 4, which is shown in an installed state as part of a fluid dispensing system in figure 3.

[0036] With reference to figure 4, there is provided a foam detection device 300 (i.e. a "FOB detector") for a beverage dispensing system 2 comprising a chamber body 340. The chamber body 340 has a first end 341, a second end 342 and a cavity 343 disposed between the first and second ends 341, 342. The foam detection device 300 also comprises a fluid inlet 321, a fluid outlet 320 and a fluid flow path (represented by arrows in figure 4) passing from the fluid inlet 321 into and through the cavity 343 and out of the fluid outlet 320. The foam detection device 300 also comprises a flow path interrupter 360 disposed in the fluid flow path within the chamber 340. The flow path interrupter 360 is configured to interrupt the flow path from the fluid inlet 321 to the fluid outlet 320 of the chamber 340 upon detection of foam in the chamber of form the chamber 340. The fluid inlet 321 is disposed at the first end 301 of the chamber body 340, and is arranged so as to guide flow into the chamber body 340 in an axial direction 309. The fluid outlet 320 is disposed at the second end 302 of the chamber body 340 and configured to guide flow out of the chamber body 340 in the axial direction 309.

[0037] Compared to the known FOB detector of figures 1 and 2, the foam detection device of figures 3 and 4 comprises a fluid inlet 321 on one side of the chamber 340 and a fluid outlet 320 on the other side of the chamber 340.

[0038] This provides a foam detection device 300 in which a beverage (in particular beer) can pass into one end of the device (i.e. the first end 301) and flow out of the other end of the device (i.e. the second end 302). In practice, this makes the FOB detector 300 much easier to install. Compared to the known FOB detector 100 described in relation to figures 1 and 2, the FOB detector 300 of the present invention provides a reduced likelihood of confusion between the fluid inlet 321 and the fluid outlet 320, and between the corresponding second and third parts 222, 223 of the fluid line 220. Compared to the known FOB detector 100 described in relation to figures 1 and 2, the FOB detector 300 of the present invention provides a reduced number of possible installation positions of the third part 223 of the fluid line 220.

[0039] An additional advantage provided by the FOB detector 100 is that the fluid inlet 321 and the fluid outlet

320 of the FOB detector can be arranged closer the means to which they should be connected.

[0040] For example, a fluid inlet 321 can be provided at an end of the FOB detector which is proximate to a coolant means 260, as best seen in figure 3. As a result of the second part 222 of the fluid line 220 being provided directly between the coolant means 260 and the fluid inlet 321 of the foam detection device 300, the second part of the fluid line 222 can be shorter than if the fluid inlet 321 were provided at a different position on the FOB detector 300. Equally, the fluid outlet 320 is provided on an opposite side of the foam detection device 300 to the fluid inlet 321, such that it is on a side of the foam detection device 300 which is close to the tap 210. This reduces the need for any additional, and potentially unsecured, tubing which would otherwise be required to connect the bottom of the foam detection device 300 to a tap 210 provided above the FOB detector, as is the case with the known FOB detector 100 of figure 2.

[0041] With reference to figure 4 in combination with figure 3, the first end 310 of the foam detection device 300 may be a lower end. The second end 320 may be an upper end. The foam detection device 300 may be configured for installation such that the first end 310 is a lower end and the second end 320 is an upper end. The foam detection device 300 may be configured such than when installed and/or when in use, the first end 310 is directly below the second end 320. The first and second ends 310, 312 may define between them an axial direction through the chamber 340, and the foam detection device may be installed such that the axial direction is substantially or wholly vertical. This orientation is particularly advantageous when the foam detection device 300 is a gravitationally actuated device. However, a skilled person would appreciate that the foam detection device 300 could be actuated by a means other than gravity. It could for example be electronically actuated in response to an output from an electronic foam sensor.

[0042] With reference to figure 4, the fluid inlet 321 may be provided as an inlet opening 323 and an inlet pipe 325. The inlet opening 323 may be an aperture in an outer surface of the foam detection device 300. The inlet pipe 325 may extend from the inlet opening 323. The inlet pipe 325 may extend from the first end 310 of the FOB detector into the fluid cavity 343, towards the second end 320. As a skilled person would appreciate, the inlet pipe 325 may have any suitable shape or configuration. The inlet pipe 325 be any means configured to guide flow towards the first end 301 of the cavity 343. Although the inlet pipe 325 is shown as surrounded by a space within the fluid cavity 343, the inlet pipe 325 could be provided as an integral part of one or more foam detection device outer walls. Equally, the inlet pipe 325 could be disposed in contact with and/or proximate to a foam detection device outer wall. The inlet pipe 325 may be configured to extend through at least a half, or at least over two thirds, or at least over three quarters of the fluid cavity 343.

[0043] The fluid interruption means 360 may be provided so as to interrupt fluid flow through the foam detection device 300. Optionally, the fluid interruption means 360 is configured to interrupt fluid flow at or proximate a lower end of the cavity 343. Optionally, the fluid interruption means 360 is configured to fully close and open the fluid flow path through the foam detection device. The fluid interruption means 360 may be a float, such as the float 360 shown in figure 4. The fluid interruption means 360 may operate as a float by having a density lower than a typical density of a beverage such as beer, such that it may float on top of such a liquid in the chamber, but a density higher than a foamed beverage, such as foamed beer, so that it may sink when the chamber contains foam. The fluid interruption means 360 may have a dimension in an axial direction 309 of at least half of the fluid cavity 343 dimension in the axial direction 309. A skilled person would appreciate that various shapes, sizes and configurations of fluid interruption means could be utilised with the foam detection device 300 of the present disclosure.

[0044] Also shown in figure 4 is the fluid outlet 320. The fluid outlet 320 may provide a flow path, and/or may be configured to guide beverage flow, from the cavity 343 to the outside of the foam detection device 300. The fluid outlet 320 may comprise an outlet opening 326 and an outlet pipe 327.

[0045] The outlet opening 326 may be configured for connection to a fluid line 220, such as fluid line 223. The outlet opening 326 may be disposed in the second end 320 of the foam detection device 300. The outlet opening 326 may be disposed in the second end 320 of the foam detection device such that when installed and/or in use, the outlet opening 326 is on a side of the cavity closest to the bar 211 and/or the tap 210. The outlet opening 326 may be disposed on the upper end of the foam detection device, such that it faces upwardly when the foam detection device is installed and/or in use.

[0046] The outlet pipe 327 may be configured to guide flow from the first end 310 of the foam detection device 300 towards the outlet opening 326. The outlet pipe 327 may be elongate, straight, hollow and/or cylindrical, however the skilled person would appreciate that various suitable shapes and configurations could be used. The outlet pipe 327 may be disposed in contact with and/or proximate to a foam detection device outer wall. The outlet pipe 327 may be configured to extend along the entire length of the fluid cavity 343. The outlet pipe 327 may be configured to extend along the entire length of the cavity 343 from the first end 310 to the second end 320. The outlet pipe 327 may be connected or connectable to the outlet opening 326. The outlet pipe 327 may not be in direct fluid communication with the fluid cavity 343. As a skilled person will appreciate, the phrase "not in direct fluid communication" in this context means that when flowing from the cavity 343 into the fluid outlet pipe 327, fluid must first pass out of the cavity 343 through another component, such as an end wall 381 of the foam detection device 300.

[0047] The chamber body 340 of the foam detection device 300 may comprise a first end wall 381 at the first end 320, and/or a second end wall 382 at the second end 320, and/or at least one side wall 344. The side wall 344 may extend between the first and second end walls 381, 382. The end walls 381, 382 and at least one side wall 344 may define the cavity 343 therebetween. The foam detection device 300 may comprise one or more tie bars 390. The end walls 381, 382 may be attached to one another by means of the one or more tie bars 390. The one or more tie bars 390 may extend through the cavity 343, and/or hold the end walls 381, 392 and the side wall 344 together in compression. The one or more tie bars 390 may exert a clamping force on the end walls 381, 382 and the side wall 344. There may be provided two tie bars 390 as shown in figure 6. The one or more tie bars 390 may be configured as described in GB patent application GB2565299.

[0048] There may be provided an inner wall 348, disposed proximate and inside the side wall 344, which may form a double-walled device 300. The inner wall 348 and side wall 344 may be located so as to define an air cavity therebetween, which may be configured to act as an insulating jacket for the cavity 343. The foam detection device 300 may be configured so that the air cavity is not fluidly connected to the cavity 343 and/or an area outside the foam detection device 300. The inner wall 348 and side wall 344 may be configured as described in GB patent application GB2565299.

[0049] The foam detection device 300 may be configured such that a beverage can flow from the fluid inlet 321 up into the fluid cavity 343, then down through the fluid cavity 343, and then turn back on itself to flow back towards the cavity 343 at the first end 310, following which it may flow back up through the fluid cavity 343 within the outlet pipe 327. The outlet pipe 327 may guide flow out of the cavity 343. When fluid passes back up through the fluid cavity 343, it may be separated from fluid within the fluid cavity 343, by means of the outlet pipe 327. The direction of fluid flow out of cavity 343 and back up through the cavity 343 by means of the fluid outlet pipe 327 may be facilitated by means of an inner outlet 329.

[0050] The inner outlet 329 may be configured to contact the fluid interrupting means 360. The inner outlet 329 may be configured to act as a valve seat, against which the fluid interrupting means 360 may abut so as to interrupt, and optionally block, fluid flow through the foam detection device 300. The inner outlet 329 may be configured to receive at least part of the fluid interrupting means 360 so as to block the fluid flow path through the foam detection device 300. The inner outlet 329 maybe fluidly connected to the fluid outlet pipe 327 by means of an inner fluid connection 328.

[0051] The inner fluid connection 328 maybe configured to guide flow from the inner outlet 329 to the fluid outlet pipe 327. The inner connection 328 may be provided as a fluid guiding means such as a pipe, through part of the chamber body of the foam detection device 300. As shown in figure 4, the inner connection 328 may be provided as a flow path through an end piece 381 of the device. The inner fluid connection 328 may be configured to define a fluid flow path in which a portion exiting the cavity 343 is substantially or wholly parallel to the fluid flow path flowing back towards the cavity 343. The inner fluid connection 328 may define a substantially U-shaped fluid flow path.

[0052] The fluid flow path through the foam detection device 300 may define a substantially S-shaped fluid flow path. The fluid flow path through the foam detection device 300 may be at least partially defined by the inlet pipe 325, the cavity 343, the inner fluid connection 328 and the outlet pipe 327.

[0053] When devising the present invention, the inventor established that an advantageous coolant system can be provided with the foam detection device 300 described herein. The improved coolant system can be best seen in figure 5.

[0054] The foam detection device 300 may comprise at least one cooling fluid flow path 331, 332. The cooling fluid flow path 331, 332 may pass through the cavity 343 between the first end 310 and the second end 320, and may pass through the chamber body in an axial direction 309. The cooling fluid flow path 331, 332 may be configured to guide coolant through the foam detection device 300. The term coolant may refer to any appropriate cooling fluid. The at least one cooling fluid flow path 331, 332 may be configured to pass through the cavity 343 between the first end 301 and the second end 302 of the foam detection device 300. The at least one cooling fluid flow path 331, 332 may comprise a coolant inlet 333, 334, and/or a coolant outlet 336, 337. The at least one cooling fluid flow path 331, 332 may have a lateral dimension of more than ¼ of the diameter of the chamber body 340.

[0055] The at least one cooling fluid flow path may be provided as a cooling flow pipe, having an elongate, hollow, straight and/or cylindrical shape. The at least one cooling flow pipe 331, 332 may be arranged within the foam detection device 300 in an axially-extending direction. A skilled person will appreciate that various different shapes and configurations of cooling flow pipe 331, 332 could be used. The at least one cooling flow pipe 331, 332 may comprise or be composed of a substantially or wholly impermeable and/or heat conductive material such as a metal or alloy. The at least one cooling flow pipe may comprise or be composed of stainless steel.

[0056] There may be provided a first cooling fluid flow path 331 and a second cooling fluid flow path 332, each having a coolant inlet 333, 334 and a coolant outlet 336, 337.

[0057] The first cooling fluid flow path 331 may comprise an inlet 333 disposed at the first end 301 of the foam detection device 300 and/or an outlet 336 disposed at the second end 302 of the foam detection device 300.

[0058] The second cooling fluid flow path 332 may comprise an inlet 334 at the first end of the foam detection

device 300 and/or an outlet 337 at the first end 301 of the foam detection device 300.

[0059] The outlet 336 of the first cooling fluid flow path 331 may be fluidly connected with the inlet 334 of the second cooling fluid flow path 332. This maybe be facilitated by means of a connecting piece 339, such as the connecting piece 339 schematically represented in figure 3.

[0060] The connecting piece 339 may be configured for connection to each cooling fluid flow path 331, 332. The connecting piece may be connected to the outlet 336 of the first cooling fluid flow path 331, and to the inlet 334 of the second cooling fluid flow path. The connecting piece may be hollow, and/or have a curved shape. The connecting piece may be substantially arc-shaped.

[0061] As a skilled person will appreciate, although the terms inlet 333, 334 and outlet 336, 377 have been described in relation to the cooling fluid flow path, the direction of coolant flow could be reversed, and as such the terms inlet and outlet in relation to the cooling fluid flow path could be reversed.

[0062] In contrast to the U-shaped cooling flow pipe described in relation to the known device of figures 1 and 2, provision the cooling fluid flow path system of figure 5 allows for there to be more efficient use of the fluid cavity 343. This enables movement of the fluid interrupting means 360. Provision of a connecting piece 339 outside of the cavity 343, and even outside of the foam detection device chamber body as shown schematically in figure 3, allows for an improved use of space in and around the foam detection device 300.

[0063] By using the improved beverage flow path described in relation to figure 4 and the improved cooling fluid flow path configuration described in relation to figure 5, a foam detection device which benefits from a synergistic effect from improvements of both of these systems is provided. The space saving of the coolant system and the improved flow configuration provided by an outlet at the second end 320 complement each other by providing a system which is not only easier to install, but also provides improved cooling, by having an arrangement in which the length of flow path of beverage proximate to a cooling fluid is increased.

[0064] Each component described above may be suitable for contacting a food or beverage for human consumption. Alternatively, only components or parts of components which come into contact with the beverage in use may be suitable for contacting a food or beverage for human consumption.

[0065] Although a specific form and arrangement of foam detection device and beer dispensing system is shown in the figures, it will be appreciated that various changes could be made to the device shown whilst still performing the function of the present invention as defined in the appended claims.

Claims

1. A foam detection device for a beverage dispensing system comprising:

   a chamber body having a first end and a second end, and a cavity disposed between the first and second ends;
   a fluid inlet, a fluid outlet, and a fluid flow path passing from the fluid inlet, into and through the cavity, and out of the fluid outlet;
   a flow path interrupter disposed in the fluid flow path within the chamber body and configured to interrupt the fluid flow path from the fluid inlet to the fluid outlet of the chamber upon detection of foam in the chamber;
   wherein the fluid inlet is disposed at the first end of the chamber body, and is arranged so as to guide flow into the chamber body in an axial direction,
   and wherein the fluid outlet is disposed at the second end of the chamber body, and is configured to guide flow out of the chamber body in the axial direction.

2. A foam detection device according to claim 1, wherein the foam detection device is configured such that the fluid flow path exits the cavity at the first end, and turns back on itself to flow back towards the cavity at the first end.

3. A foam detection device according to claim 1 or claim 2, wherein the foam detection device is configured such that the fluid flow path exits the cavity at the first end, and turns back on itself to guide flow back towards the cavity at the first end, to then guide flow back through the cavity.

4. A foam detection device according to any of the preceding claims, wherein the fluid flow path enters the cavity at the first end, exits the cavity at the first end, and further exits the cavity at the second end.

5. A foam detection device according to claim 4, wherein the fluid flow path turns back on itself after exiting the cavity at the first end, to guide flow towards and then through the cavity, following which it exits the cavity at the second end.

6. A foam detection device according to any of the preceding claims, comprising at least one cooling fluid flow path, passing through the cavity between the first end and the second end.

7. A foam detection device according to claim 6, wherein the cooling fluid flow path has a cooling inlet at the first end, a cooling outlet at the second end, and passes through the chamber body in an axial direc-

tion.

8. A foam detection device according to claim 6 or claim 7, comprising at least two cooling fluid flow paths, each cooling fluid flow path passing through the chamber body between the first end and the second end.

9. A foam detection device according to any of claims 6 to 8, wherein the or each cooling fluid flow path is defined by a cooling fluid pipe, wherein the or each cooling fluid flow path is preferably substantially straight.

10. A foam detection device according to any of the preceding claims, wherein the chamber body comprises a first end wall at the first end, a second end wall at the second end, and at least one side wall extending between the first and second end walls, the end walls and at least one side wall defining the cavity therebetween.

11. A foam detection device according to any of the preceding claims, wherein the at least one cooling fluid flow path has a lateral dimension of at least ¼ of the diameter of the chamber body.

12. A foam detection device according to any of the preceding claims, wherein the foam detection device is configured such that in use, the first end is disposed below the second end.

13. A beverage dispensing system comprising:

a fluid source, the fluid source being configured to contain a fluid to be dispensed;
a fluid dispensing line, the fluid dispensing line being connectable to the fluid source to allow fluid to leave the fluid source through the fluid dispensing line;
a fluid dispensing means, the fluid dispensing means being connectable to the fluid dispensing line and being operable to restrict or allow fluid to pass through the fluid dispensing means;
a foam detection device as claimed in any preceding claim, the foam detection device being arranged in the fluid dispensing line, such that fluid passing from the fluid source passes from the fluid inlet, to the fluid outlet, via the fluid flow path of the foam detection device before passing to the fluid dispensing means.

14. A beverage dispensing system according to claim 14, further comprising a cooling system having a cooling fluid flow path which enters the cavity at the first end, exits the cavity at the second end, turns back on itself and reenters the cavity at the second end, and then exits the cavity at the first end.

15. A kit of parts for the device of any of claims 1 to 12, comprising at least:

a chamber body;
a fluid inlet, fluid outlet and flow path;
a flow interrupter;
the kit of parts being configured such that, when assembled, the chamber body, fluid inlet, fluid outlet, flow path and flow interrupter provide the device of any of claims 1 to 12.

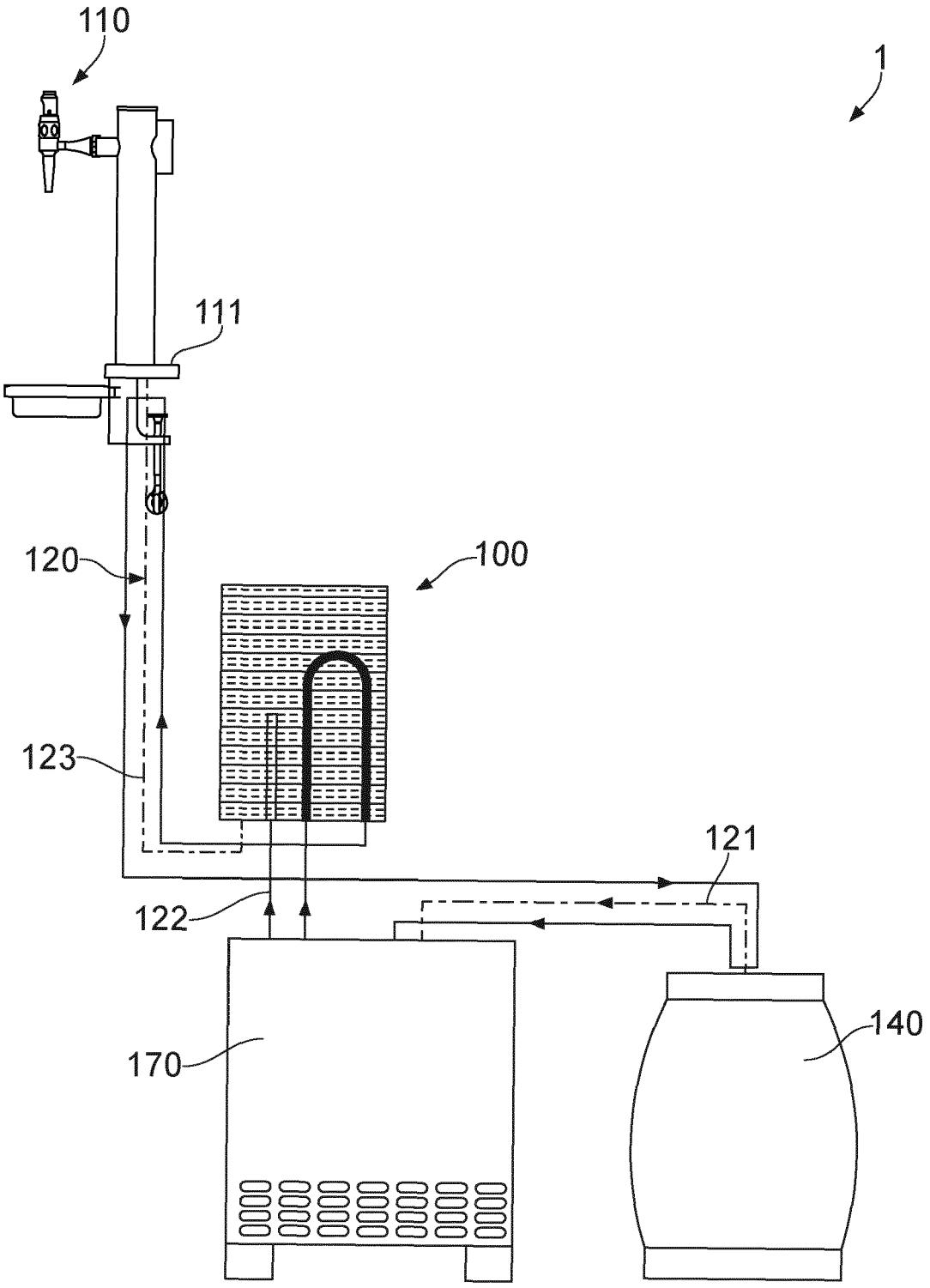

FIG. 1 (Prior Art)

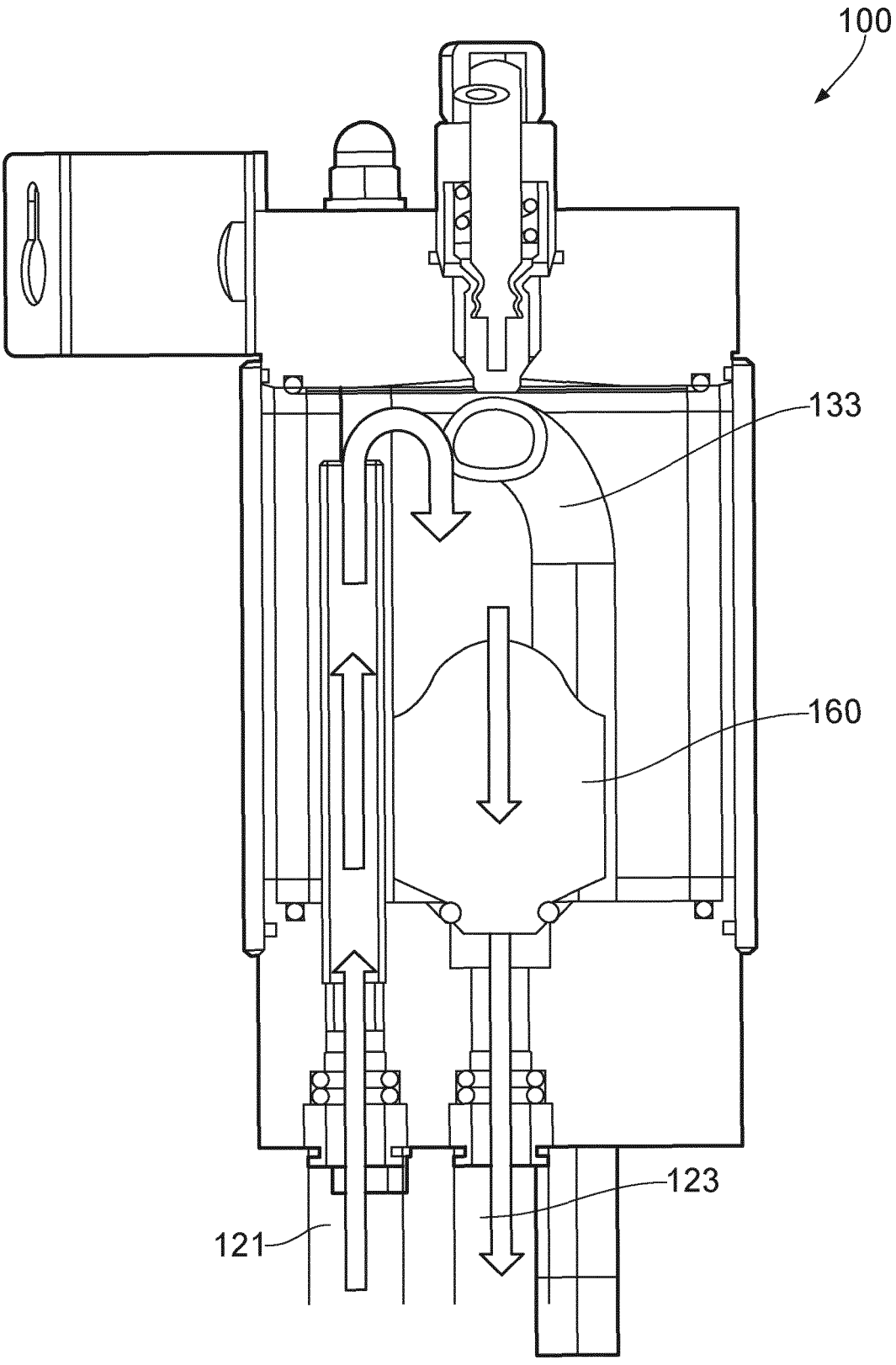

FIG. 2 (Prior Art)

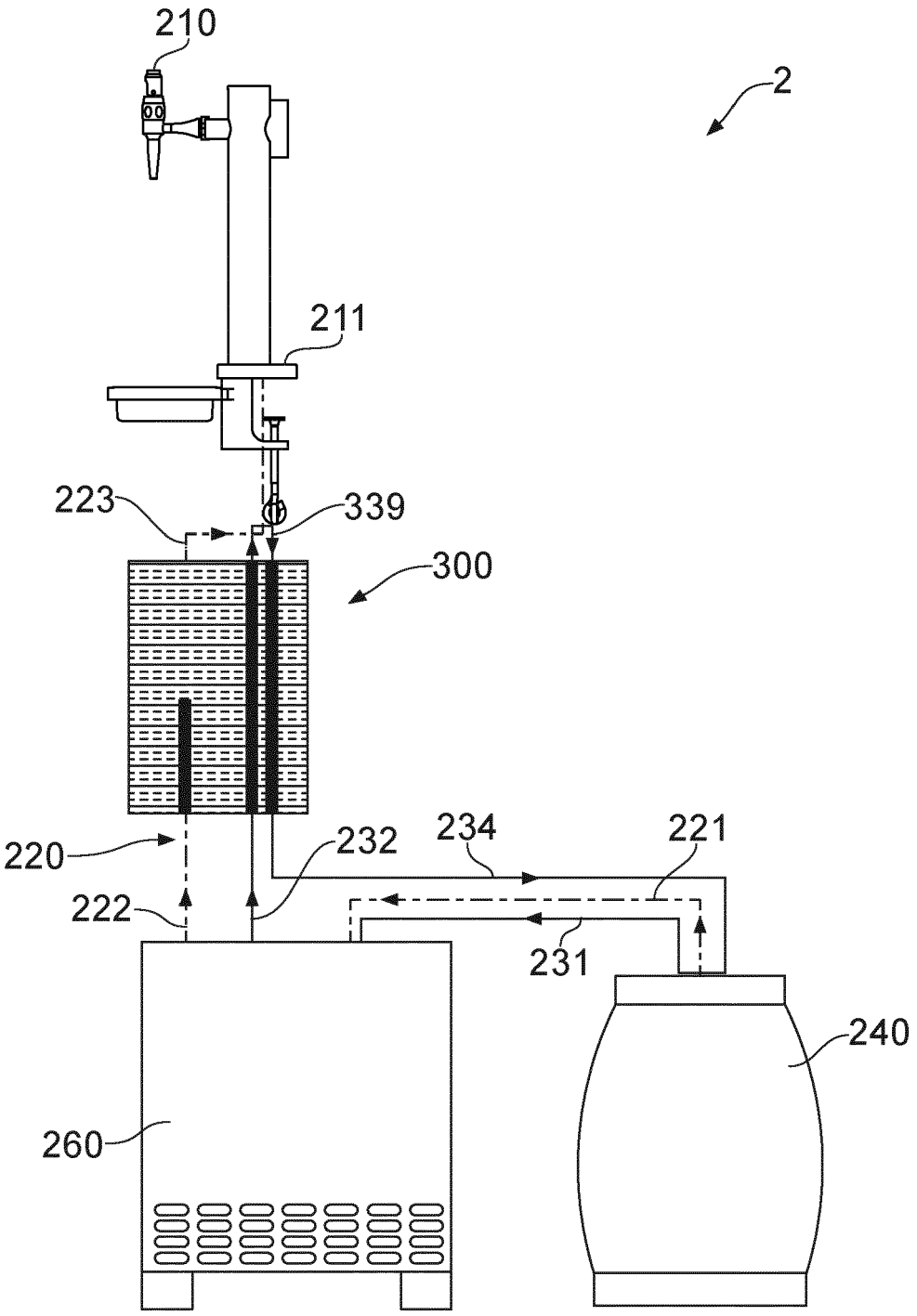

FIG. 3

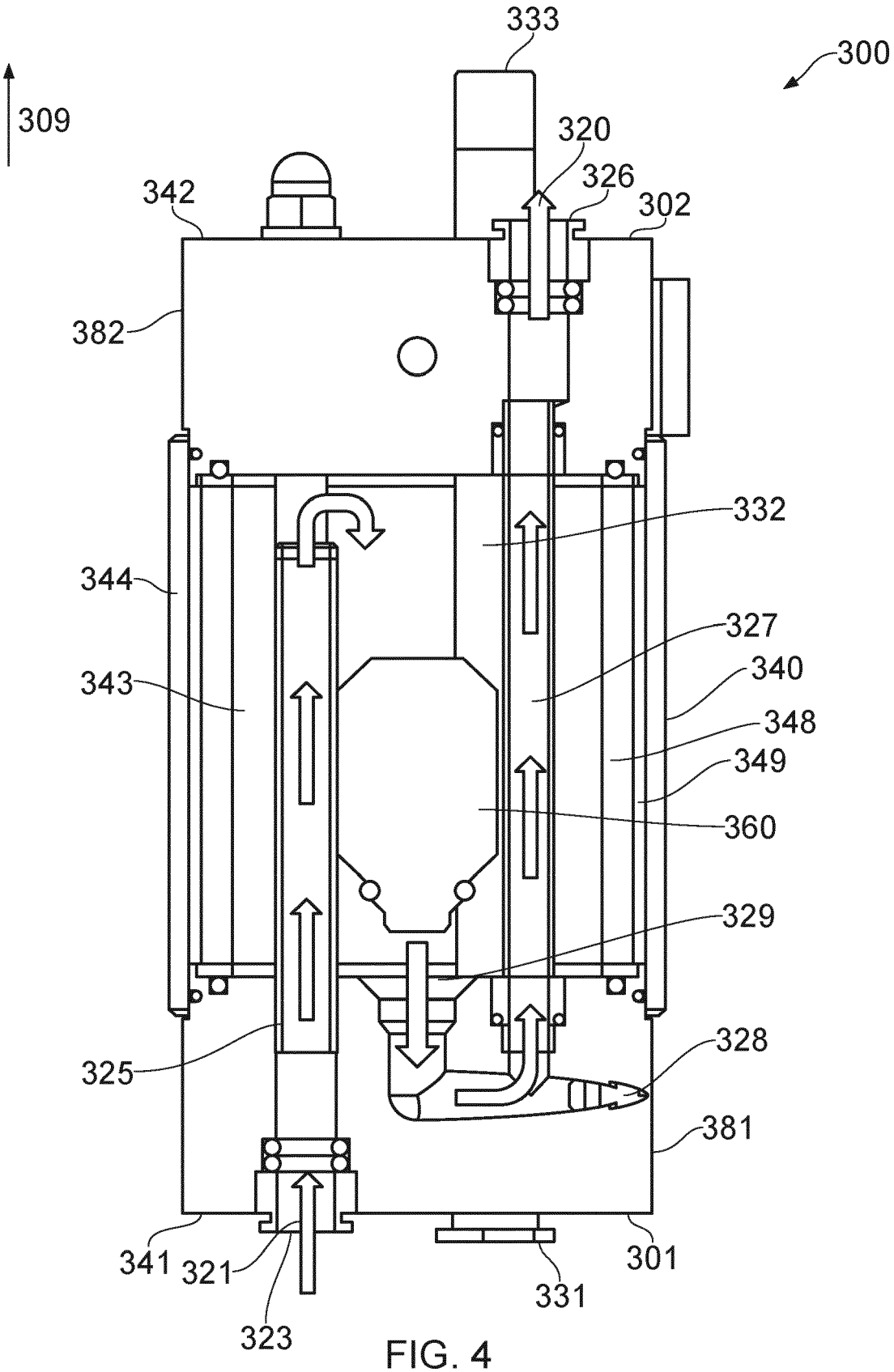
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FIG. 4

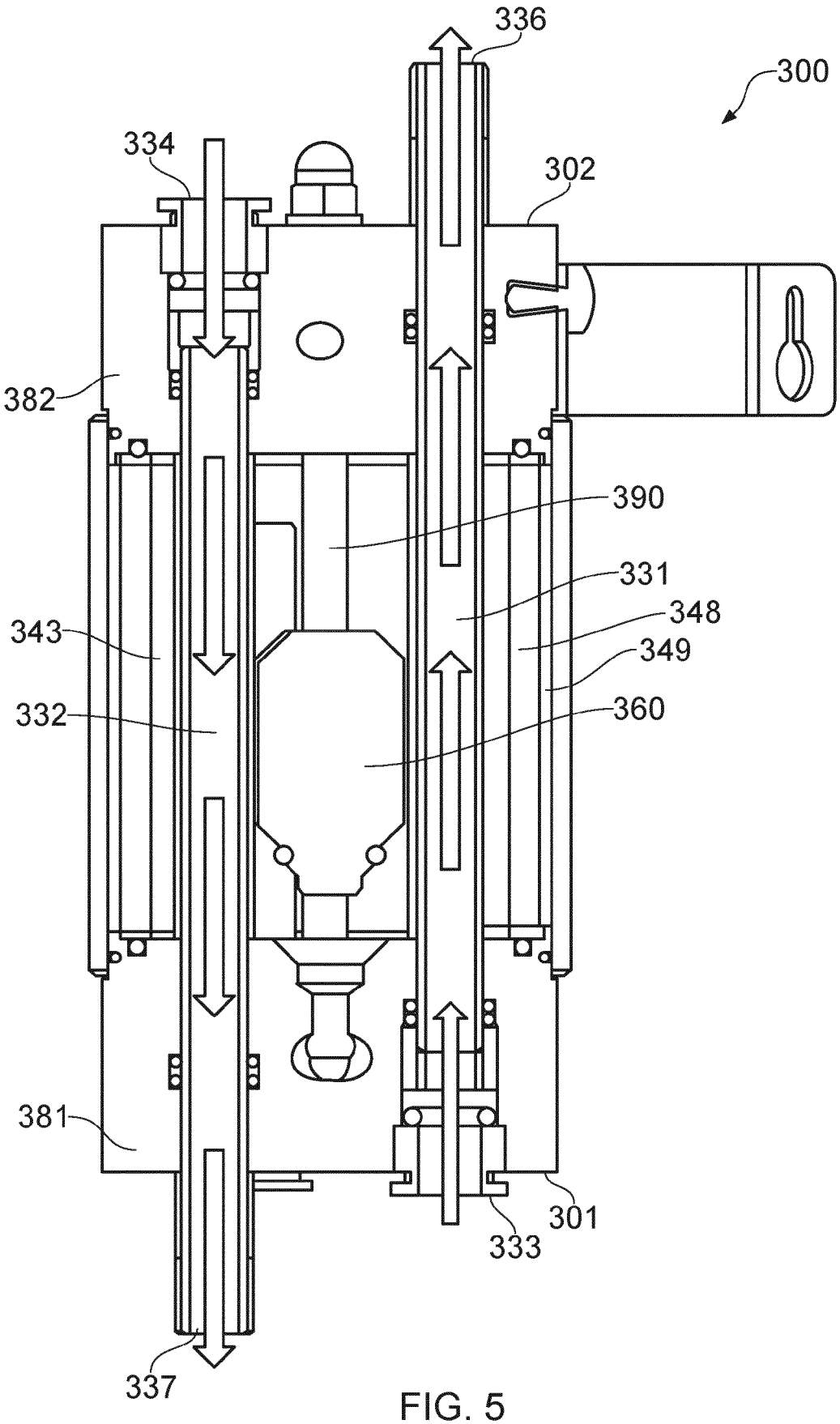

FIG. 5

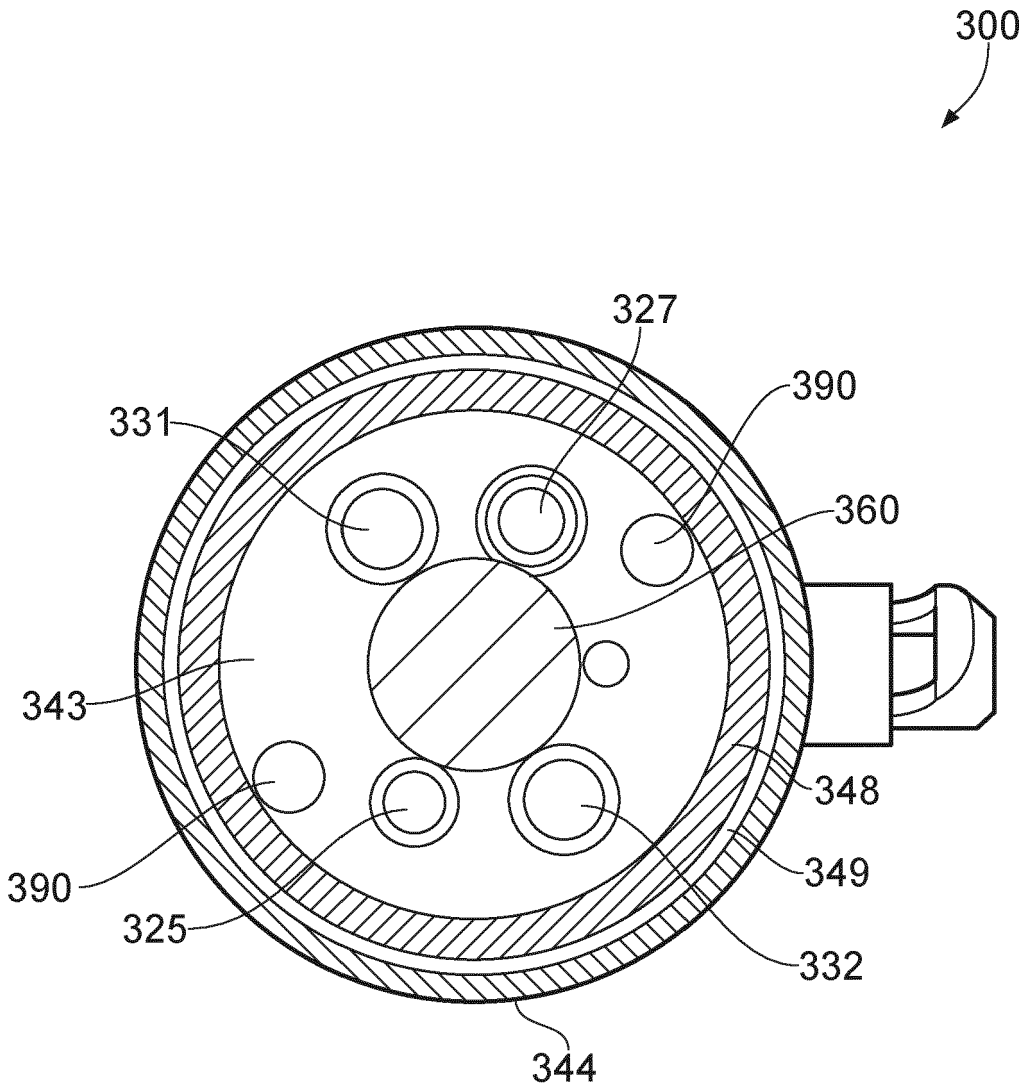

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2565299 A **[0005] [0030] [0047] [0048]**