US 20050089420A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0089420 A1**

Laing (43) **Pub. Date: Apr. 28, 2005**

(54) **CIRCULATION PUMP**

(75) Inventor: **Karsten Laing**, Althutte (DE)

Correspondence Address:
FOLEY & LARDNER
P.O. BOX 80278
SAN DIEGO, CA 92138-0278 (US)

(73) Assignee: **Oliver Laing, Karsten Laing, and Birger Laing**

(21) Appl. No.: **10/682,311**

(22) Filed: **Oct. 8, 2003**

(30) **Foreign Application Priority Data**

Oct. 12, 2002 (DE)..... 102 47 753.1

Publication Classification

(51) **Int. Cl.**[7] **F04B 17/00**; F04B 35/04

(52) **U.S. Cl.** **417/423.1**; 417/423.14; 417/435

(57) **ABSTRACT**

A circulation pump for fluid and, in particular, a rotary pump with a rotatable impeller and a degassing device is suggested, wherein the degassing device comprises a gas line which opens at a first end into an area on the impeller and which opens at a second end into an area with a lower pressure in relation to an interior pressure of the circulation pump.

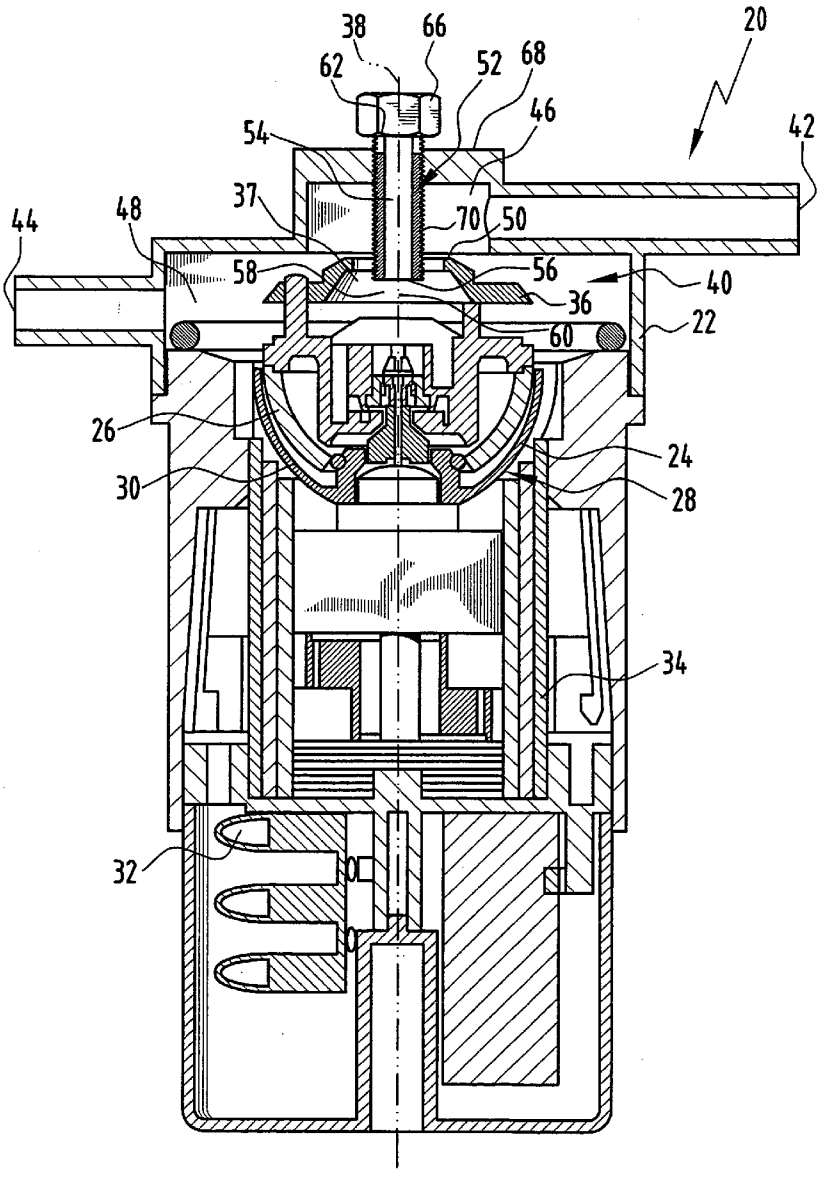
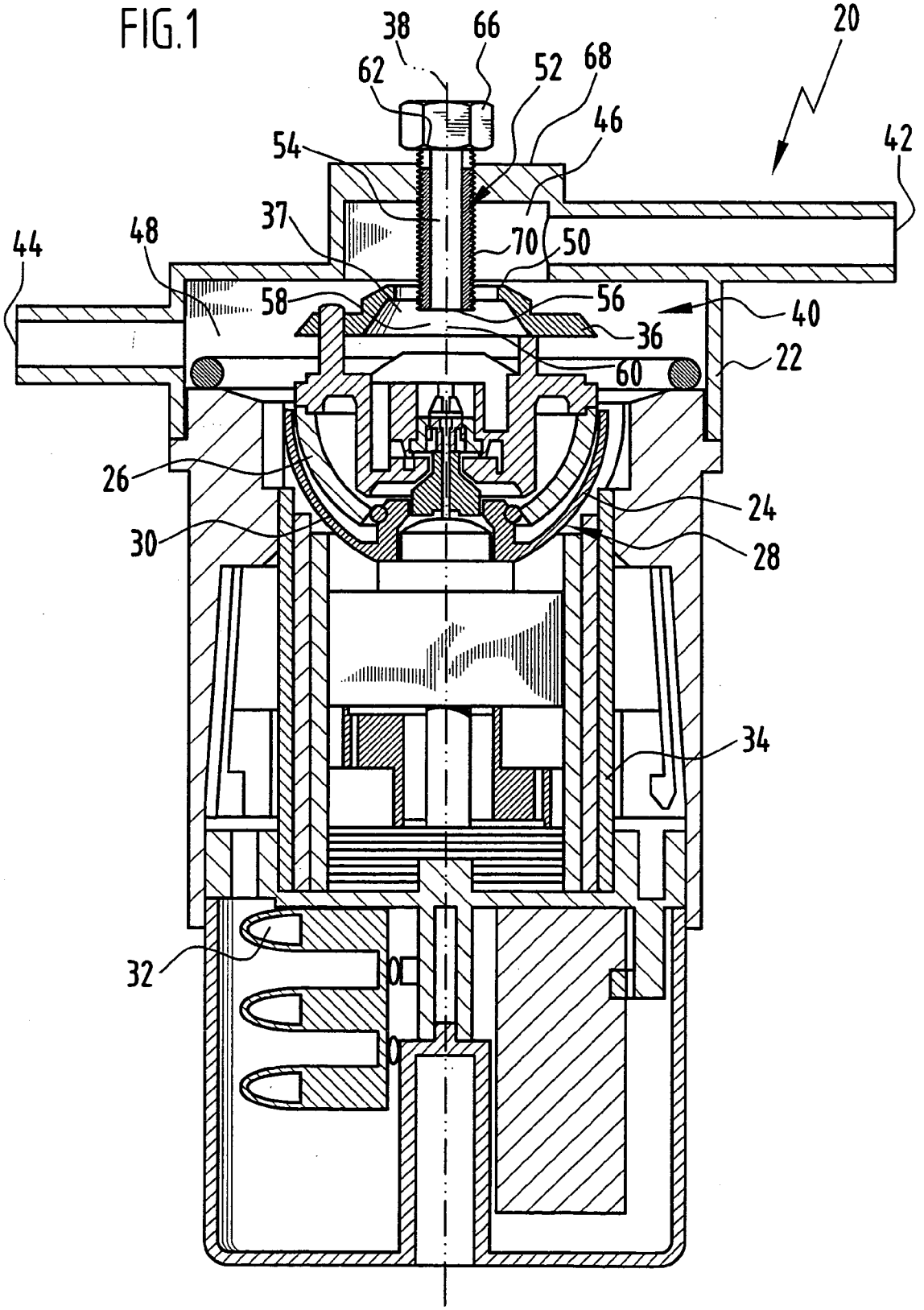


FIG.1


38
66
20
62
52
68
46
54
42
37
48
70
50
44
58
56
40
36
22
60
26
24
30
28
34
32

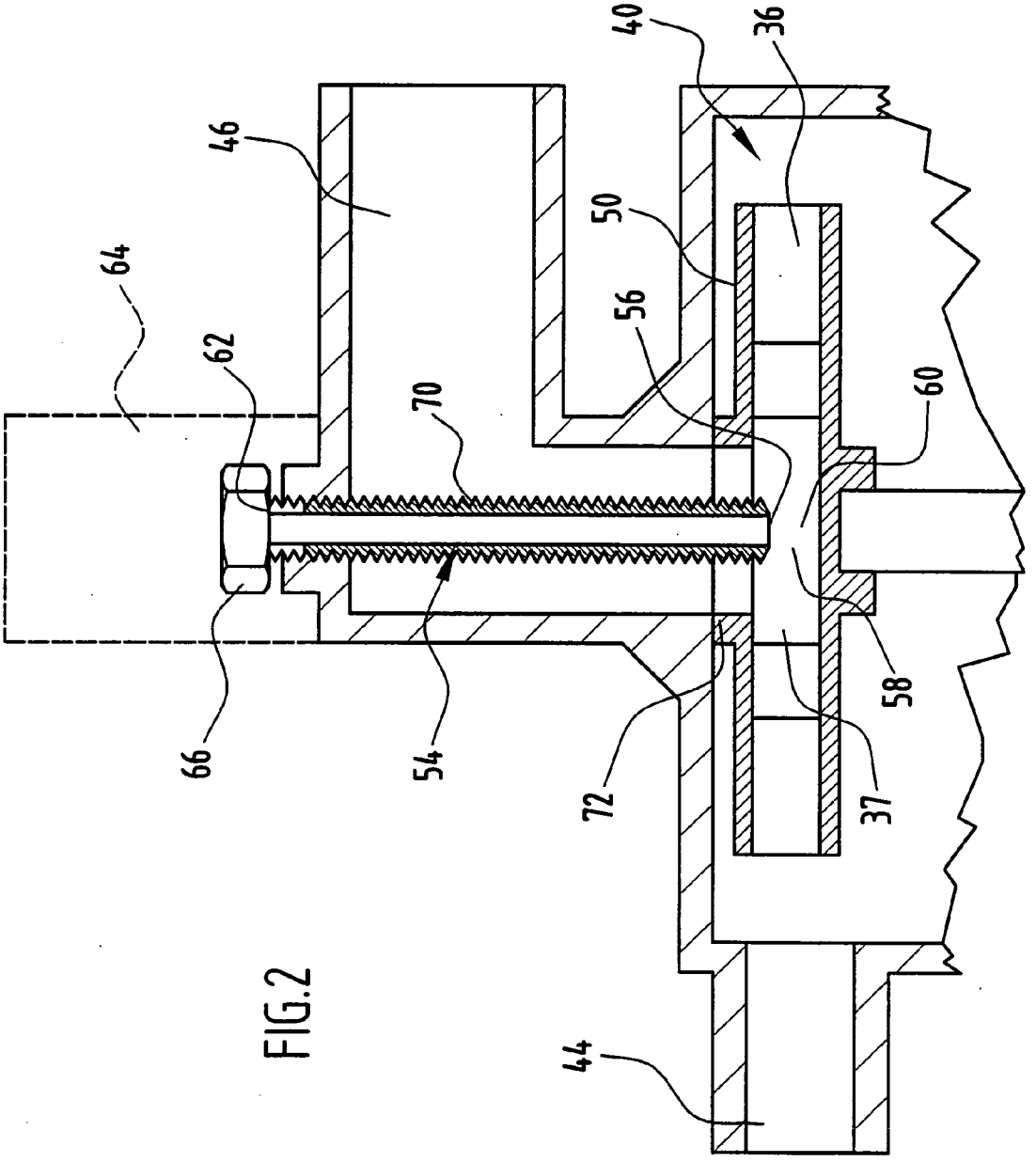


FIG.2

FIG.3

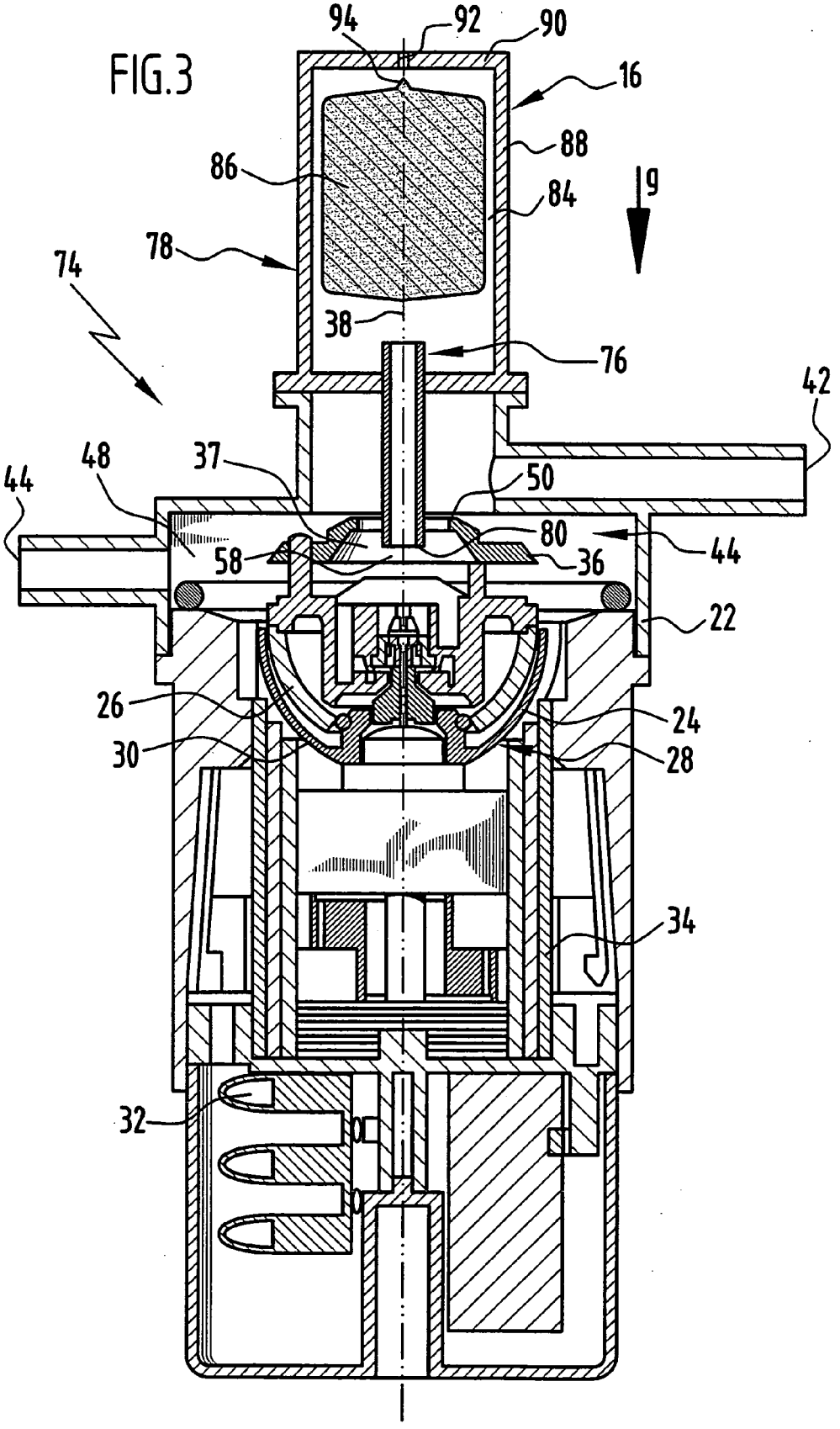
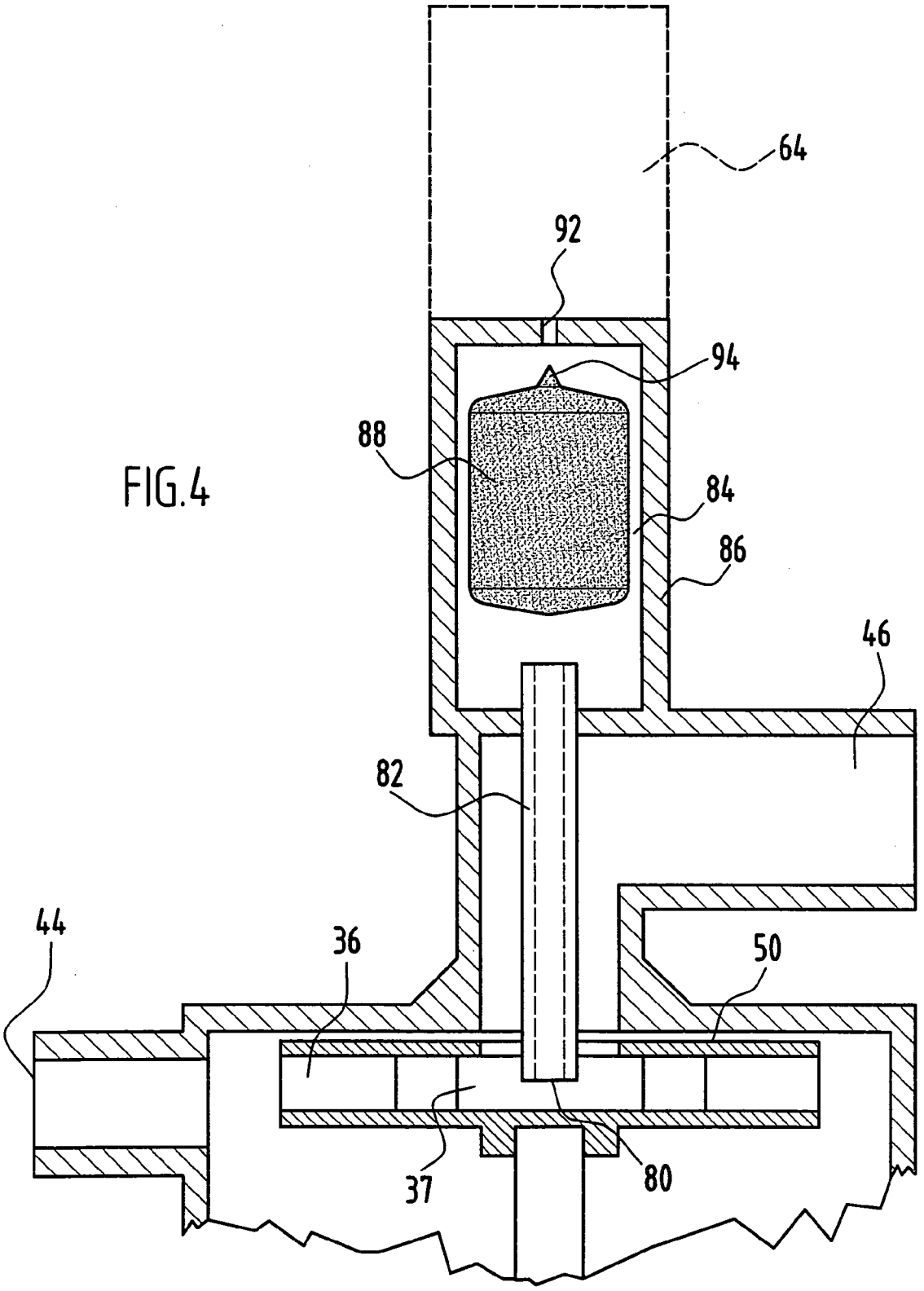

94
92
90
16
88
86
84
9
78
74
38
76
42
48
37
50
44
80
44
58
36
22
26
24
30
28
34
32

FIG.4



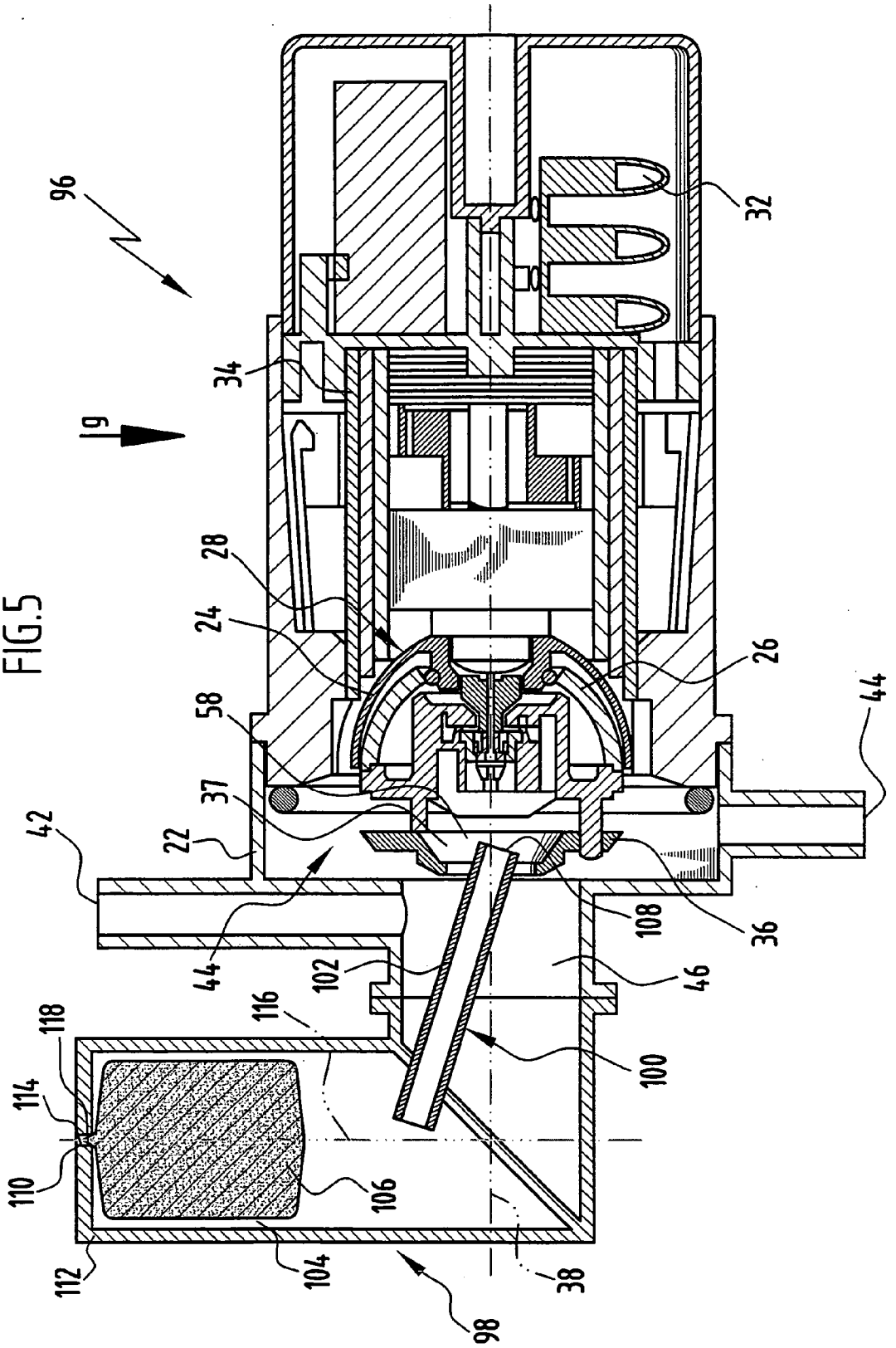

96
9
32
34
28
24
26
58
44
37
42
22
36
108
44
102
46
116
118
100
114
110
106
112
104
98
38

FIG.5

FIG.6

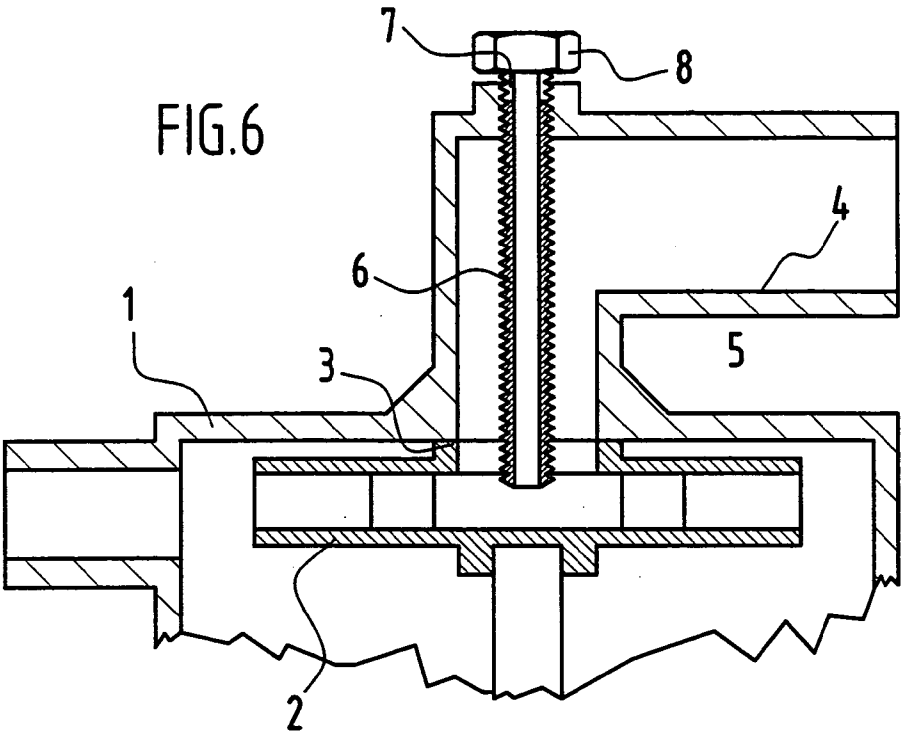
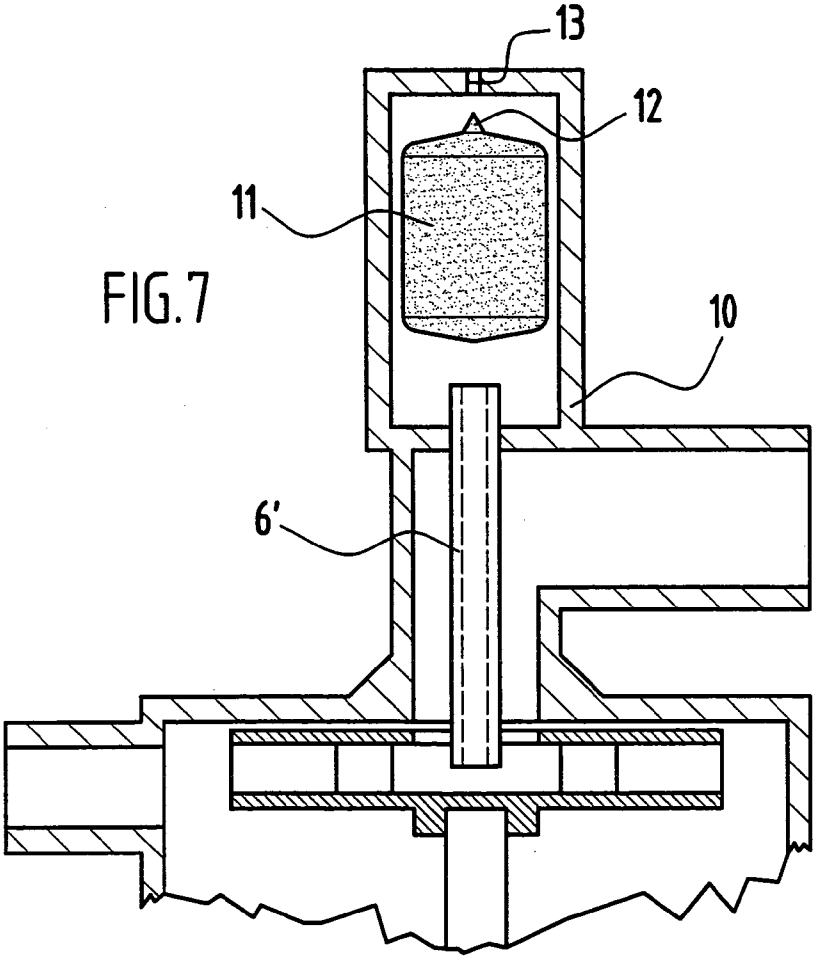


FIG.7



CIRCULATION PUMP

[0001] The invention relates to a circulation pump for fluid and, in particular, a rotary pump with a rotatable impeller and a degassing device.

[0002] In the case of a circulation pump which conveys, for example, domestic water, the problem which occurs is that gas and, in particular, air can be dissolved in the fresh water and be released during heating. A cushion of gas can accumulate in the circulation pump due to gas being released and this can lead to a reduction in the volume displaced or even to blockage of the circulation pump.

[0003] With certain systems it is possible for a certain percentage of air to remain during the refilling with fluid. Provision must then be made for venting during operation or during the starting of operation.

[0004] The object underlying the invention is to provide a circulation pump which may be vented in a simple manner.

[0005] This object is accomplished in accordance with the invention, in the circulation pump for fluid mentioned at the outset and comprising a rotatable impeller and a degassing device, in that the degassing device comprises a gas line which opens at a first end into an area on the impeller and which opens at a second end into an area with a pressure which is lower in relation to an interior pressure of the circulation pump.

[0006] Strong fluid eddies are formed at the impeller or rather around the impeller and, in particular, in an interior or cavity of the impeller. In the case of gas dissolved in the fluid, a cushion of gas can then accumulate at this area and this interrupts the transport of fluid. With the inventive solution, this cushion of gas may be broken up in the case of a system which has a higher interior pressure than an area, into which the gas line opens, in that the cushion of gas is, to a certain extent, "tapped". The gas line opens into the exact area, in which cushions of gas can accumulate on account of the formation of eddies. On account of the difference in pressure, the gas may be coupled out in order to be able to break up the cushion of gas in this way.

[0007] No external device for generating eddies need be provided since the formation of eddies at the impeller takes care of the separation of gas. As a result, no loss of power occurs and increases in power which can be in the order of magnitude of 20% may be achieved in comparison with circulation pumps with a separate separating device. The inventive degassing device functions, in principle, irrespective of its position, i.e., irrespective of whether an axis of rotation of the impeller is aligned, for example, parallel or at right angles to the direction of gravitation.

[0008] The first end of the gas line opens, in particular, into an area on the or rather around the impeller, in which fluid eddies can be formed. In the impeller, fluid eddies are preferably formed in an interior area. Consequently, the gas line also opens into this interior area. For the same reason, it is advantageous when the first end of the gas line opens into an area around the impeller, in which gas can accumulate.

[0009] A higher interior pressure than exterior pressure preferably prevails at least during operation and, in particular, in an intake area of the circulation pump a higher pressure in the fluid than a pressure in the exterior space. As a result, gas may be "discharged" without any additional resources in order to vent the circulation pump. When the second end of the gas line is coupled to the exterior space, a discharge of gas for venting the circulation pump can then be brought about from the first end.

[0010] A valve is, in particular, arranged at the second end of the gas line in order to provide for a controlled venting of the circulation pump. As a result, it is possible for the second end to have to be opened in relation to the exterior space only when this is accordingly necessary.

[0011] The gas line can, in particular, be closed at its second end in order to prevent any exiting of fluid during normal operation.

[0012] In this respect, it is possible for the gas line to be closed manually, wherein a venting process is carried out by opening the closure manually as required, for example, during the starting of operations or when the volume displaced falls below a threshold value. Such a circulation pump may be vented irrespective of its position in the field of gravity.

[0013] In a constructionally simple embodiment, a screw is provided for closing the gas line.

[0014] It may also be provided for the gas line to be closed automatically. The gas line is open for venting so that gas can be discharged.

[0015] If the gas has been discharged, i.e., the circulation pump vented, the gas line is then closed automatically in relation to the exterior space, in particular, in order to prevent the exiting of fluid.

[0016] In a constructionally simple embodiment, a float is provided for closing the gas line and this is in effective fluid communication with an interior of the circulation pump. If the float is lying in fluid, the float is pressed against a corresponding contact element due to it being lifted up such that the second end of the gas line is closed and, as a result, no fluid can exit. If the float is not lying in fluid on account of a cushion of gas, the float can also not close the second end. As a result, gas can, on the other hand, exit from the second end and, as a result, a venting of the circulation pump can be carried out.

[0017] The float is arranged, in particular, in a receiving chamber of the gas line, wherein this receiving chamber is in effective fluid communication with the second end and the first end of the gas line. As a result, the float can be acted upon with fluid or venting gas can flow out through the receiving chamber.

[0018] The gas line is favorably guided through an intake area of the circulation pump. As a result, the first end of the gas line may be positioned in an intake area of the circulation pump.

[0019] The first end of the gas line opens, in particular, into an area in the vicinity of a sealing gap between an intake area and the impeller. In this area, eddies are formed which lead to a separation of gas/fluid and, therefore, again lead to the accumulation of gas.

[0020] In one embodiment which is simple from the point of view of production technology, the gas line comprises a pipe. The first end may be positioned in the corresponding

area in an interior of the circulation pump by means of such a pipe in order to be able to "tap" cushions of gas.

[0021] It may be provided for the gas line to be aligned essentially parallel to the axis of rotation of the impeller at least in one section. When a float for the automatic opening/closing of the second end of the gas line is provided, a line which ascends with respect to the direction of gravity must be provided. This may be achieved by way of alignment of the circulation pump with respect to the direction of gravity and/or by way of a corresponding design of the gas line.

[0022] It may be provided for the gas line to be aligned at an angle to an axis of rotation of the impeller at least in one section. As a result, a float with a direction of movement transverse to an axis of rotation of the impeller may also be provided. This makes it possible, on the other hand, for the circulation pump to be installed in a transverse position (with the axis of rotation transverse to the direction of gravity).

[0023] If the external pressure is not enough to make a pressure gradient available between the interior of the circulation pump and the exterior space, a device generating underpressure can be arranged at the second end of the gas line.

[0024] The circulation pump is designed, in particular, as a rotary pump, wherein the impeller is preferably arranged on a rotor which is mounted in a spherical bearing.

[0025] The first end of the gas line preferably faces a central area of the impeller and, in particular, faces an interior of the impeller or opens into an interior of the impeller. As a result, a cushion of gas which forms in this area may be "tapped" effectively.

[0026] For the same reason, it is favorable when the first end of the gas line faces a side of the impeller which is allocated to an intake side of the circulation pump.

[0027] The following description of preferred embodiments serves to explain the invention in greater detail in conjunction with the drawings. These show:

[0028] **FIG. 1 a** sectional view of a first embodiment of an inventive circulation pump;

[0029] **FIG. 2** an enlarged illustration of one area of the circulation pump according to **FIG. 1**, in which an impeller is arranged;

[0030] **FIG. 3 a** sectional view of a second embodiment of an inventive circulation pump;

[0031] **FIG. 4** an enlarged illustration of a section from **FIG. 3**;

[0032] **FIG. 5 a** third embodiment of an inventive circulation pump;

[0033] **FIG. 6 a** view of an embodiment of a degassing device for manual venting and

[0034] **FIG. 7** an embodiment of a degassing device for automatic venting.

[0035] A first embodiment of an inventive circulation pump, which is shown in **FIG. 1** as a whole and designated as **20**, comprises a housing **22**. A stator **24** and a rotor **26** are arranged in the housing **22**. The rotor **26** is mounted in a spherical bearing **28** so that the circulation pump **20** is a rotary pump. The rotor **26** has a spherical surface facing the stator **24** at least in one section. A bearing shell **30** of the spherical bearing **28**, which is arranged on the stator **24**, likewise has a spherical surface facing the rotor **26** at least in one section.

[0036] The stator **24** is designed so as to generate a magnetic field. For this purpose, it is provided with windings **32** and magnetic return-pass elements **34**, such as, for example, stacks of metal sheets.

[0037] An impeller **36** (vane wheel) is seated on the rotor **26** and this is rotatable about an axis of rotation **38**. The impeller **36** is arranged in an interior **40** of the circulation pump **20** and can rotate in this interior **40**. The impeller **36** itself has an inner space or cavity **37**.

[0038] The circulation pump **20** is provided with a connection **42** for coupling in fluid and with a connection **44** for coupling out fluid. The impeller **36** is located between the connections **42** and **44**.

[0039] The connection **42** is connected to an intake area **46** of the circulation pump **20**. Fluid is drawn in via this intake area **46**. The connection **42** is therefore located at the suction side of the circulation pump **20**. The connection **44** is connected to a pressure area **48** of the circulation pump **20**. It is therefore located on a pressure side of the circulation pump **20**.

[0040] The impeller **36** is located so as to face the intake area **46** with a surface **50**. It is located in the pressure area **48** with its circumferential side. The interior **40** is a flow-through chamber between the suction side and the pressure side. Fluid is guided through the circulation pump **20** via this flow-through chamber, wherein the impeller **36** conveys a rotational momentum to the fluid guided through. As a result, the required pressure is generated for pumping the fluid through. The impeller **36** has a corresponding structure in order to be able to generate this pressure.

[0041] When gaseous fluids, such as, for example, aerated water, are conveyed, the fundamental problem which occurs is that bubbles of gas can be formed which hamper or even block the transport of the fluid through the circulation pump **20**. In the area of the impeller **36**, namely, in particular, facing the intake area **46**, eddies are formed in the fluid which, in the case of fluids with dissolved gas, lead accordingly to gas being able to accumulate in the area, in which the eddies are formed, and a cushion of gas being able to form.

[0042] In accordance with the invention, a degassing device **52** is provided (which is a venting device in the case of air dissolved in the fluid), via which such a bubble of gas or such a cushion of gas may be broken up. For this purpose, the inventive degassing device comprises a gas line **54** which opens with a first end **56** into an area **58**, in which a cushion of gas can be formed. The gas line **54** opens, in particular, with its first end **56** into an area **58** which faces a central area **60** of the impeller **36** around the axis of rotation **38** and is located on the impeller **36**. As a result, the first end **56** of the gas line **54** is located directly in the area, in which any blocking of the transport of fluid may occur due to formation of bubbles of gas. The gas line **54** preferably opens into the cavity **37** of the impeller **36**.

[0043] The gas line **54** has a second end **62** which is located opposite the first end **56**. This second end **62** opens

into an area, in which a lower pressure prevails than the interior pressure in the area **58** of the circulation pump **20**. A lower pressure than the pressure of the circulation pump **20** on the suction side must prevail in this area. Normally, the pressure of the fluid on the intake side is, in the case of fluid pumps, higher than the external pressure. In this case, the second end **62** then opens into the exterior space. It may, in principle, also be provided, as shown schematically in **FIG. 2**, for the second end **62** to be coupled to a device **64** for generating underpressure which is arranged, in particular, outside the circulation pump **20**. When the external pressure is not lower than the pressure of the fluid on the intake side in the circulation pump **20**, a lower pressure level may be generated via this device **64** in order to generate a pressure gradient from the inside to the outside in this way.

[**0044**] When the pressure on the intake side in the interior **40** of the circulation pump **20** is greater than the external pressure, a pressure gradient is present between the first end **56** and the second end **62**. This leads to a "discharge" of gas when the first end **56** opens into a cushion of gas. Since, in the case of a rotary pump with an impeller **36**, the eddy area is known and, therefore, the area, in which a cushion of gas can accumulate, gas may be concertedly discharged from the interior **40** by means of the inventive solution, with which the first end **56** faces the central area **60** of the impeller **36**, and, as a result, the circulation pump **20** vented.

[**0045**] It is provided, in particular, for the gas line **54** to be closable in relation to the exterior space in order to make a valve available for the discharge of gas in this way. In the embodiment shown in **FIGS. 1 and 2**, a screw **66** is seated in the area of the second end **62** and the gas line **54** may be closed via this screw in the area of the second end and, in particular, may be closed manually. During normal operation of the circulation pump **20**, the screw is closed. For venting the circulation pump **20**, the screw is opened in order to provide for a "discharge" of the gas which has accumulated in the interior **40**. Such venting is carried out, for example, when the volume displaced in the circulation pump **20** has decreased noticeably.

[**0046**] In the embodiment shown in **FIG. 1**, the gas line **54** is formed by a pipe which is guided through the intake area **46** from one end **68** of the housing **22** of the circulation pump **20** as far as the area **58**. Such a pipe **70** is, in particular, of a rigid design.

[**0047**] In order to be able to fix the screw **66** to the pipe **70**, the pipe **70** is provided with an internal thread, for example, in the area of the second end **62** or the pipe **70** has an external thread or is connected to a screw head.

[**0048**] The pipe **70** can be arranged parallel to the axis of rotation **38** and, in particular, be concentric to it. Venting is possible irrespective of whether the circulation pump **20** is aligned in an upright position (with the axis of rotation parallel to the direction of gravitation) or in a transverse position (with the axis of rotation **38** transverse to the direction of gravitation).

[**0049**] A sealing gap **72** can be arranged between the surface **50** of the impeller **36** and the intake area **46**, wherein the second end **62** of the gas line **54** opens into the area **58** in the vicinity of the sealing gap **72** and the sealing gap **72** surrounds this area **58**, in particular.

[**0050**] In a second embodiment of an inventive circulation pump, which is shown in **FIG. 3** as a whole and designated as **74**, the parts relevant for the pumping operation are of the same design as for the circulation pump **20**. Therefore, the same reference numerals are used for parts which are the same as in the first embodiment **20**.

[**0051**] With the circulation pump **74**, a degassing device **76** is provided which comprises a gas line **78**. This has a first end **80** which opens into the area **58**. The first end **80** is arranged on a pipe **82** as a section of the gas line **78**. The pipe **82** leads into a receiving chamber **84** for a float **86**. The receiving chamber **84** is formed in a housing **88**. The float **86** is movable in the receiving chamber **84** in a direction parallel to the axis of rotation **38**.

[**0052**] At its end **90** located opposite the first end **80** the housing **88** as part of the gas line **78** has an opening **92** which is an outlet opening of the gas line **78** and, is, therefore, its second end. At its end facing the end **90** of the housing **88** the float **86** is provided with a closure element **94** which can engage in the opening **92**. The closure element **94** and the opening **92** are adapted to one another accordingly. When the closure element **94** engages in the opening **92**, the housing **88** is closed in a fluid-tight manner in relation to the exterior space.

[**0053**] When the opening **92** is open, i.e., the float **86** is so far away from the opening **92** that this is free, gas can flow from the area **98** via the pipe **82** through the receiving chamber **84** of the gas line **78** into the exterior space and, as a result, the circulation pump **74** is vented.

[**0054**] In this respect, the circulation pump **74** is preferably arranged with the axis of rotation **38** parallel to the direction of gravity or approximately parallel to it so that the pipe **82** is ascending (in **FIG. 3**, the direction of gravity is indicated by the arrow g). The float **86** falls downwards in the direction of the pipe **82** on account of its own weight when no uplifting force is present.

[**0055**] If fluid enters the receiving chamber **84** via the pipe **92**, the float **86** experiences an uplifting force and is pressed upwards until it abuts on that wall which forms the end **90** of the housing **88**. The opening **92** is closed by the closure element **94** engaging in it and, in particular, is closed in a fluid-tight manner so that no fluid can pass into the exterior space.

[**0056**] If, however, a cushion of gas has formed, gas then rises into the receiving chamber **84**, gradually displaces the fluid in this chamber and the level of fluid in it sinks.

[**0057**] As a result, the float **86** releases the opening **92** and gas can flow off through the pipe **92** and the receiving chamber **84** in order to vent the circulation pump **74**. Fluid is subsequently supplied as a result of venting and this flows into the receiving chamber **84** and therefore conveys the float **86** to the end **90** again and closes the opening **92**. An automatic venting of the circulation pump **74** may be achieved by means of the degassing device **98** via the automatic opening and closing of the opening **92** as second end of the gas line **78**.

[**0058**] Otherwise, the degassing device **76** functions as described above in conjunction with the degassing device **52**.

[**0059**] A device **64** generating an underpressure can also be coupled to the opening **92** as second end of the gas line **78** (**FIG. 4**).

[0060] In a third embodiment of a circulation pump, which is shown in **FIG. 5** and designated as a whole as **96**, the parts relevant for the pumping function are the same as in the embodiments **20** and **74**. Consequently, the same reference numerals have also been used.

[0061] A degassing device **98** is provided which comprises a gas line **100** with a pipe **102** and a receiving chamber **104** for a float **106**. A first end **108** of the gas line **100** is formed on the pipe **102**, wherein this first end **108** opens into the area **58**. A second end **110** of the gas line **100** is formed in a housing **112** for the receiving chamber **104** at an opening **114**. Gas can flow into the receiving chamber **104** through the pipe **102** from the first end **108** and then exit from the opening **114** into the exterior space.

[0062] The float **106** is movable in the receiving chamber **104** in a direction **116**. The direction **116** is transverse and, in particular, at right angles to the axis of rotation **38**.

[0063] The pipe **102** as a section of the gas line **100** is at an angle to the axis of rotation **38**, i.e., inclined in relation to it and at an angle to the direction **116**, i.e., inclined in relation to it. As a result, an ascending line **102** is present even with a transverse installation. (In **FIG. 5**, the direction of gravity is indicated by the arrow g).

[0064] The float **106** has a closure element **118** which faces the opening **114** and can engage in the opening **114** in order to close this in a fluid-tight manner.

[0065] The housing **112**, in which the receiving chamber **104** is formed, extends, for example, in the shape of a bend with two transverse arms lying along the axis of rotation **138** and along the direction **116**.

[0066] The circulation pump **96** is installed such that the direction **116** is parallel or at least approximately parallel to the direction of gravitation. An automatic venting of the circulation pump may then be achieved, as described above in conjunction with the second embodiment **74**: When no cushion of gas is present in the area **58**, fluid is pressed through the pipe **102** into the receiving chamber **104** and, as a result, the float **106** is moved upwards until the opening **114** is closed by the closure element **118**. When a cushion of gas is formed, the opening **114** is not closed since fluid is displaced out of the receiving chamber **104** on account of the gas. As a result, gas can be coupled out via the gas line **102**; gas flows out of the cushion of gas through the gas line **100** into the exterior space on account of the difference in pressure between the interior **44** and the exterior space, whereby the cushion of gas is broken up in the area **58** and the circulation pump **96** vented accordingly.

[0067] Otherwise, the circulation pump **96** functions as described above.

[0068] Rotary pumps have the disadvantage that during the transport of gaseous fluids in the pump impeller a separation takes place, during which a bubble is formed in the center of the impeller which can lead to the complete interruption of the transport of fluid.

[0069] The invention relates to a device which prevents this formation of bubbles.

[0070] **FIG. 6** shows a device for manual venting.

[0071] **FIG. 7** shows a device for automatic venting.

[0072] **FIG. 6** shows schematically a rotary pump with a housing **1**, in which the pump impeller **2** rotates. A sealing gap **3**, in the vicinity of which a bubble of gas **5** is formed during transport of gaseous water, is located between the area **4** on the intake side and the pump impeller **2**. A pipe **6** protrudes into this area and this allows the gas of the bubble of gas to flow outwards in the case of systems, with which the fluid pressure on the intake side is greater than the external pressure. The pipe **6** is designed as a screw and has in the end area an opening **7**, through which gas can flow out. If the pipe is screwed shut, the screw head **8** interrupts the exit of fluid.

[0073] **FIG. 7** shows the same rotary pump, with which the venting pipe **6'** does, however, end in a housing **10** which forms a unit with the intake side and in which a float **11** is located, the valve needle **12** of which is pressed into the valve seat **13** by the float **11** as soon as the valve housing **10** is filled with fluid whereas the valve needle **12** sinks when gas enters and allows the gas to flow out.

[0074] The venting of domestic water circulation pumps lubricated by water is of particular importance since, in the case of gas accumulation, the pump bearings are damaged due to dry friction, above all in the case of pumps in hot water heating systems, with which the supply of heat to the house can be interrupted by a bubble of air.

[0075] In one embodiment of an inventive rotary pump, integrated into a system, the interior pressure of which is higher than the external pressure, with an intake side and a pressure side and a sealing gap between the pump impeller and the intake area, the open end of a closable pipe, which serves the purpose of venting and leads into a space, in which a lower pressure prevails than the pressure on the suction side of the pump, is arranged in the vicinity of the sealing gap.

[0076] A venting pipe can be connected to a device generating underpressure.

[0077] The venting pipe is formed, for example, on the exit side as a screw which forms a closable valve at the same time.

[0078] The venting pipe can alternatively be connected to a float housing which contains a float which opens a valve leading to the outside when gas enters the float housing.

[0079] The float housing can form one unit with the pump housing.

[0080] The lubrication of the bearings of the pump impeller is preferably brought about by the fluid displaced.

[0081] The pump serves the purpose of, for example, circulating hot water in a closed system.

[0082] The venting pipe preferably has a diameter of such a size that water located in the float housing is not hindered from exiting by capillary forces.

1. A circulation pump for fluid, comprising:

a rotatable impeller; and

a degassing device,

wherein the degassing device comprises a gas line opening at a first end into an area on the impeller and

opening at a second end into an area with a lower pressure in relation to an interior pressure of the circulation pump.

2. The circulation pump as defined in claim 1, wherein the first end of the gas line opens into an area on the impeller where fluid eddies are able to form.

3. The circulation pump as defined in claim 1, wherein the first end of the gas line opens into an area on the impeller where gas is able to accumulate.

4. The circulation pump as defined in claim 1, wherein a higher interior pressure than external pressure prevails at least during operation.

5. The circulation pump as defined in claim 4, wherein the second end of the gas line opens into an exterior space.

6. The circulation pump as defined in claim 1, wherein a valve is arranged at the second end of the gas line.

7. The circulation pump as defined in claim 1, wherein the gas line is adapted to be closed at its second end.

8. The circulation pump as defined in claim 7, wherein the gas line is adapted to be closed manually.

9. The circulation pump as defined in claim 7, characterized in that wherein a screw is provided for closing the gas line.

10. The circulation pump as defined in claim 7, wherein the gas line is adapted to be closed automatically.

11. The circulation pump as defined in claim 10, wherein a float is provided for closing the gas line said float being in effective fluid communication with an interior of the circulation pump.

12. The circulation pump as defined in claim 11, wherein the float is arranged in a receiving chamber of the gas line.

13. The circulation pump as defined in claim 1, wherein the gas line is guided through an intake area of the circulation pump.

14. The circulation pump as defined in claim 1, wherein the first end of the gas line opens into an area in the vicinity of a sealing gap between an intake area and the impeller.

15. The circulation pump as defined in claim 1, wherein the gas line comprises a pipe.

16. The circulation pump as defined in claim 1, wherein the gas line is aligned essentially parallel to the axis of rotation of the impeller at least in one section.

17. The circulation pump as defined in claim 1, wherein the gas line is aligned at an angle to an axis of rotation of the impeller at least in one section.

18. The circulation pump as defined in claim 1, wherein a device generating underpressure is arranged at the second end of the gas line.

19. The circulation pump as defined in claim 1, wherein the pump is a rotary pump.

20. The circulation pump as defined in claim 1, wherein the impeller is arranged on a rotor mounted in a spherical bearing.

21. The circulation pump as defined in claim 1, wherein the first end of the gas line faces a central area of the impeller.

22. The circulation pump as defined in claim 1, wherein the first end of the gas line faces a side of the impeller allocated to an intake side of the circulation pump.

23. The circulation pump as defined in claim 1, wherein the impeller has a cavity, the first end of the gas line opening into said cavity.

24. A circulation pump for fluid, comprising:

an internal pump region adapted to have fluid flow therethrough during operation of the pump; and

a gas line extending from said internal pump region and adapted to facilitate venting of gas accumulating within said internal pump region.

25. The circulation pump as defined in claim 24, further comprising an impeller, wherein the gas line opens into an area on the impeller where fluid eddies are able to form.

26. The circulation pump as defined in claim 24, wherein the gas line is adapted to vent gas to a region having lower pressure than a pressure of the internal region.

27. The circulation pump as defined in claim 24, wherein gas line is adapted to vent gas into an exterior space.

28. The circulation pump as defined in claim 24, further comprising: a valve positioned along the gas line to control the venting of gas.

29. The circulation pump as defined in claim 24, further comprising: a float in effective fluid communication with the internal region and adapted to open a valve when sufficient gas has accumulated.

30. The circulation pump as defined in claim 29, wherein the float is arranged in a receiving chamber of the gas line.

* * * * *